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PRORXD Broadcast Receiver User Guide

Broadcast Solutions, HD/SD Products, PRORXD

Tactical Communications and Surveillance

Commercial in Confidence

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0. Preface

0.1 About this Publication

This publication contains details required for the Operation and Administration of the equipment or system.

Since the available functions are licensed and rely on the actual installation, not all the functions and or applications contained in this document can be related or applicable to the system you will be working with.

Actual screen presentation can be different from those in this document because of software changes or your browser configuration.

0.2 Who Must Read this Publication

This publication is meant for anyone interested in how the system can best be used, but it is of most benefit to:

- **Operators** who are in charge of the daily operation of the equipment.
- **Installers** who are responsible for the pre-installation, on-site installation and configuration of the system in the end-user environment.
- **Maintainers** who are responsible for maintaining the equipment or system.

0.3 Your Knowledge

In this publication we think you have a full knowledge of:

- Basic Personal Computer Operations.
- Basic Radio Frequency (RF) Principles.

0.4 Notice about Specifications

While Cobham tries to keep the precision of the information contained in its material guides, the information can change without notice. Performance specifications included in this publication are included for customer guidance and to help system installation. Actual operating performance can change.

0.5 Notice about this Guide

The material described in this publication has continuous development and improvement. All applicable details of the material and its functions (with the information and applicable details in this guide) are given by Cobham in good faith. But, it is acknowledged that there can be errors or omissions in this guide.

0.6 Typographic Conventions

This publication uses these typographic conventions to identify text that has a special meaning:

Typographic Convention	Example
TEXT in small capitals represents a key push on the console keyboard or hardware panel .	ESC, F1, SHIFT
The + sign means "hold down the first key while pushing the second key".	Push CTRL+C to abort
<Text> Serves as a placeholder for text that you will replace as applicable to its context.	Use the filename <systemname>.sys for...
Text in bold emphasises a new word or term of significance.	We name this a protocol and its function is...
[-a] Text in these brackets shows an optional component that can be left out.	Ls [-a]
NN This shows a value entered on a numeric keypad .	45 on the numeric keypad
Successive menu selections are shown with arrows to show a sub-menu. In this example this means: Select the Insert menu, then select picture , then select from file .	Insert > picture > from file

0.7 Symbols

This publication uses these symbols to highlight important information:

WARNING: A written notice given to a reader when a situation might cause personal injury or loss of life.

CAUTION: A written notice given when a situation might cause damage to or destruction of equipment or systems.

Note: A written notice given to tell you something or to supply more information.

0.8 Trademarks

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0.9 Related Publications

It can also be necessary to read:

Publication	Source
Solo Concept Guide	Cobham Tactical Communications and Surveillance
IP Concept Guide	Cobham Tactical Communications and Surveillance

0.10 Revision History

This publication was written and produced by the Cobham Technical Publications Team.

This is a change controlled publication. Each page of this publication shows a revision number at the bottom left corner.

Changes to a page will increase the revision status of the full publication.

Revision	Date	Authors	Summary of Changes
SharePoint			

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1. Systems Description

The equipment in this User Guide is:

Equipment Title	Part Numbers
Broadcast Receiver, 1U Version	PRORXD-2-1RU PRORXD-4-1RU
Broadcast Receiver, 2U Version	PRORXD-2-2RU PRORXD-4-2RU PRORXD-6-2RU PRORXD-8-2RU



Figure 1-1 – PRORXD Broadcast Receiver, 1RU Version

1.1 What is the PRORXD-1RU Broadcast Receiver?

The ProRXD-1RU is a feature-rich COFDM receiver/decoder with DUAL optional receive and HD decoding function in one enclosure. Designed especially for the demanding broadcast market, it is supplied in a 1/2 19" 1RU high rack chassis, where two units can be mounted together to occupy a 19" slot and uses standard broadcast connectors for signal interfaces.

It is available with 2-way or 4-way maximum ratio combining RF inputs; ensuring video is recovered without the distortions usually linked with fading and multipath. All DVB-T 6/7/8MHz modes are supported, plus Cobham's 6/7/8MHz UML (Ultra Mobile Video Link) modulation – designed to enhance performance when utilising higher frequency bands or in high-speed TX applications such as Motorsport. Cobham Narrowband, enabling broadcast quality (4.8Mbps) signals to be transmitted in only 2.5MHz bandwidth is available optionally.

Designed to operate with external Cobham down-converters, the receiver can be located up to 100m from the antennas when operating with standard 75Ω co-axial cables.

The unit incorporates a very flexible decoding platform, with low-delay SD and HD MPEG2 and H.264 decoding ensuring compatibility with all Cobham and most 3rd party encoders. An optional 2nd decoder can be enabled, allowing 2 x SD or HD signals to be decoded. Multiple video output formats are offered with composite and SDI outputs in SD mode and HD-SDI and in HD mode. SDI/HD-SDI has embedded audio and HDMI outputs are supplied for operation with domestic TVs. ASI in /out is offered optionally.

A full Genlock function is available in SD and HD modes. When in HD mode, an optional downconverted SD composite video monitoring output is also offered.

The unit can also be used as an IP decoder. When paired with a Cobham Broadcast IP Encoder, the unit can send an IFB signal to the remote location through the reverse leg of the IP link. An optional adaptive bit-rate encoding/decoding mode is also available, allowing fully automated operation on adjustable capacity or contended networks such as VSAT or BGAN terminals.

The ProRXD-1RU can be controlled through its OLED front panel display and on its RS232 or IP Ethernet browser control interfaces.

A full On Screen Graphical display is available for monitoring and diagnostics, which can be enabled or disabled separately on the two video outputs.

1.2 What are the Key Features of the PRORXD-1RU?

- DVB-T & UML (optional) demodulation
- 2 or 4 RF inputs with 8/12DC switchable down converter powering
- Fully compliant MPEG2 and H.264 SD/HD decoding
- HD-SDI/SDI with embedded audio out
- Composite video outputs (with optional HD down-conversion)
- HDMI outputs
- IFB input (IP mode)
- 2nd decoder (optional)
- Auto bit-rate capability (with Cobham Broadcast IP Encoder)
- ASI input and output (optional)
- Front panel control (+ Web-browser and RS232)
- Genlock input
- Full on-screen display (OSD) diagnostics
- Ultra low delay video operation for real-time applications
- 1RU half-rack mounting
- 12VDC powering (AC adaptor supplied)



Figure 1-2 – PRORXD Broadcast Receiver, 2RU Version

1.3 What is the PRORXD-2RU Broadcast Receiver?

The ProRXD-2RU is a feature-rich COFDM receiver/decoder with DUAL receive and HD decoding capability in one enclosure. Designed especially for the demanding broadcast market, it is supplied in a 1/2 19" 2RU high rack chassis, where two units can be mounted together to occupy a 19" slot and uses standard broadcast connectors for signal interfaces.

It is available with 6-way or 8-way maximum ratio combining RF inputs, ensuring video is recovered without the distortions usually linked with fading and multipath. All DVB-T 6/7/8MHz modes are supported, plus Cobham's 6/7/8MHz UML (Ultra Mobile Video Link) modulation – designed to enhance performance when utilising higher frequency bands or in high-speed TX applications such as Motorsport. Cobham Narrowband, enabling broadcast quality (4.8Mbps) signals to be transmitted in only 2.5MHz bandwidth is available optionally. Designed to operate with external Cobham downconverters, the receiver can be located up to 100m from the antennas operating with standard 75Ω co-axial cables.

The unit incorporates a very flexible decoding platform, with low-delay SD and HD MPEG2 and H.264 decoding ensuring compatibility with all Cobham and most 3rd party encoders. An optional 2nd decoder can be enabled, allowing 2 x SD or HD signals to be decoded. Multiple video output formats are offered with composite and SDI outputs in SD mode and HD-SDI and in HD mode. SDI/HD-SDI each have embedded audio and HDMI outputs are supplied for operation with domestic TV's. ASI in /out is offered optionally.

A full Genlock facility is available in SD and HD modes. When in HD mode, an optional downconverted SD composite video monitoring output is also offered.

The unit can also be used as an IP decoder. When paired with a Cobham Broadcast IP Encoder, the unit can send an IFB signal to the remote location through the reverse leg of the IP link. An optional adaptive bit-rate encoding / decoding mode is also available, allowing fully automated operation on adjustable capacity or contended networks such as VSAT or BGAN terminals.

The ProRXD-2RU can be controlled through its full-colour front panel touch- screen display, and on its RS232 or IP Ethernet browser control interfaces.

A full On-Screen Graphical display is available for monitoring and diagnostics, which can be enabled or disabled separately on the two video outputs.

1.4 What are the Key Features of the PRORXD-2RU?

- DVB-T & UML demodulation
- 2, 4, 6 or 8 RF inputs with 8/12DC switchable downconverter powering
- Fully compliant MPEG2 and H.264 SD/HD decoding
- HD-SDI/SDI with embedded audio out
- Composite video outputs (with optional HD down- conversion)
- HDMI outputs
- IFB input (IP mode)
- 2nd decoder optional
- Auto bit-rate capability (with Cobham Broadcast IP Encoder)
- ASI input and output
- Front panel control (+ Web-browser and RS232)
- Genlock input
- Full on-screen display (OSD) diagnostics
- Ultra-low delay video operation for real-time applications
- 2RU half-rack mounting
- 12VDC powering (AC adaptor supplied)

1.5 Getting an Overview of the PRORXD-2RU

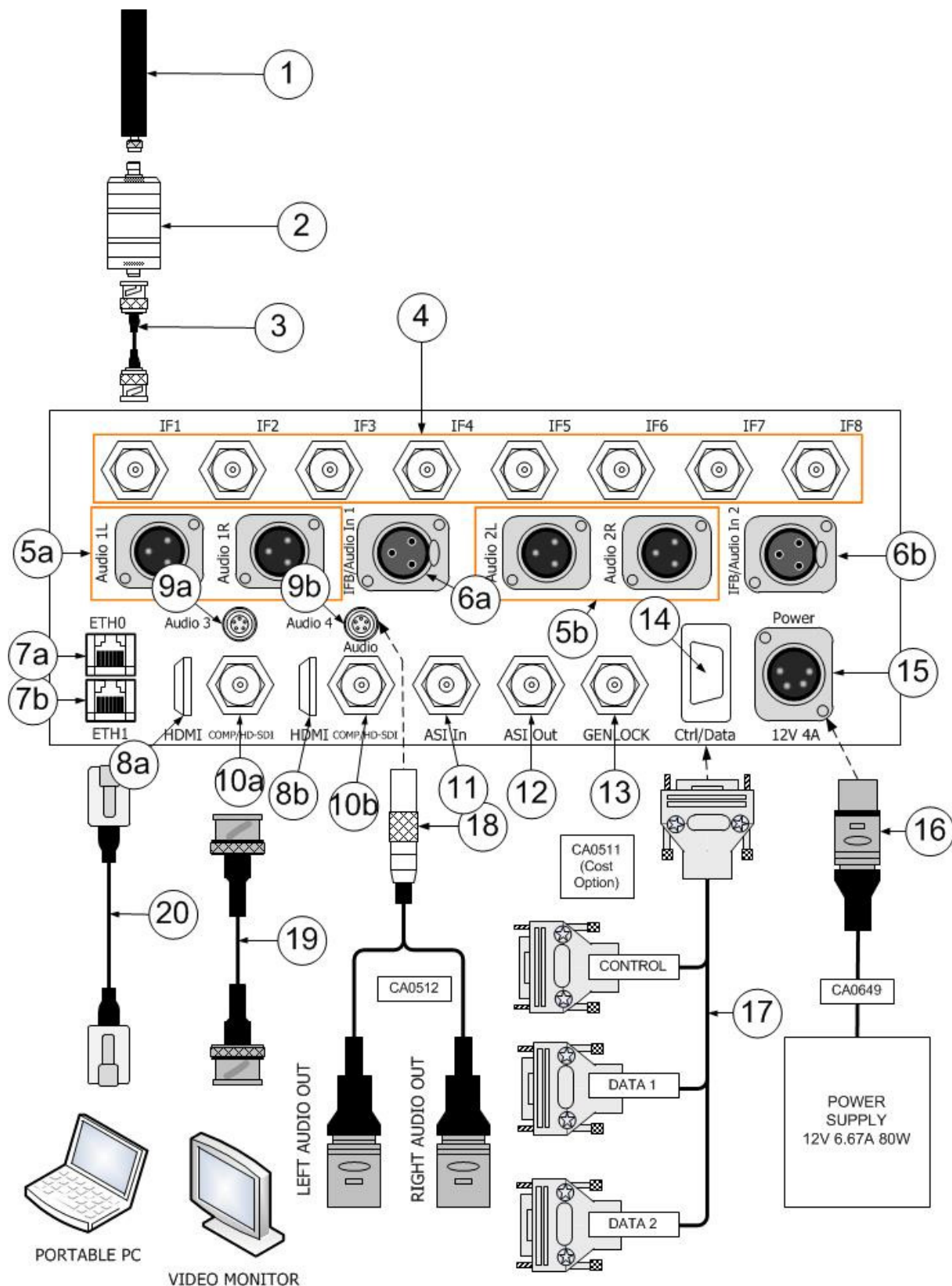


Figure 1-3 Main System Diagram

No	Item	Function
1	Antenna.	Matched to band of the downconverter. Do not tighten too much – tighten with your hand.
2	Downconverter.	Enables the PRORXD to be used in different RF bands. CAUTION: Do not turn the barrel of the downconverter when attaching antennas or IF cables. Too much twisting will damage the inner pin. CAUTION: Do not install the Downconverter upside down . Power from the IF cable will damage components in the downconverter.
3	IF cable, TNC 2-way plug, (pins) to BNC 2-way plug, (pins).	Downconverter to PRORXD connection. IF – Intermediate Frequency.
4	BNC 2-way receptacle (sockets), 50-850MHz, marked IF1 to IF8.	The IF cables from the downconverters connect here.
5ab	XLR 3-way receptacle (pins) marked AUDIO 1L and AUDIO 1R. Channel two is marked AUDIO 2L and AUDIO 2R.	Stereo Line Level Audio Outputs, left and Right, channel one and two.
6ab	XLR 3-way receptacle (sockets) marked IFB/Audio In 1. Channel 2 is marked IFB/Audio In 2.	IFB – Interruptible Fold back. The IFB is a special intercom circuit that consists of a mix-minus program feed sent to an earpiece worn by presenter via IP (audio that is being "fed back" to presenter) that can be interrupted and replaced by a television producer's or director's intercom microphone. That microphone is connected here. Each channel has this facility.

No	Item	Function
7ab	RJ45 8-way receptacle (sockets) marked ETH0 and ETH1.	Ethernet 1 and 2. 10/100/1G Ethernet Ports with PoE (Power over Ethernet) support. Used for Remote Control through a web browser and for streaming.
8ab	HDMI receptacle (sockets) marked HDMI.	HDMI Video output. Each channel has this facility.
9ab	Lemo OB 5-way receptacle (sockets) twin key marked AUDIO 3. Channel two is marked AUDIO 4.	For Audio output. Each channel has this facility.
10ab	BNC 2-way receptacle (sockets) marked COMP/HD-SDI.	CBVS/SDI/HD-SDI//ASI video output.
11	BNC 2-way receptacle (sockets) marked ASI In.	ASI Input.
12	BNC 2-way receptacle (sockets) marked ASI Out.	ASI Output.
13	BNC 2-way receptacle (sockets) marked GENLOCK.	Genlock Input.
14	D-Type 15-way receptacle (sockets) marked CTRL/DATA.	RS232 Control from PC GUI Application. RS232 Data Output, 1K2 to 115K2 baud switchable.
15	XLR 4-way receptacle (pins) marked POWER, 12V 4A.	6 to 26V Reverse Polarity Protected Power from AC Adapter.
16	XLR 4-way plug (sockets).	From AC Adapter.
17	Pro-RX/B External RS232 Control/Data1/Data2 Cable Assembly 2 metres.	CA0511
18	Pro-RXB External XLR Audio Cable Assembly 2 metres.	CA0512
19	BNC-BNC Video Cable.	CA0006

No	Item	Function
20	Standard Ethernet Cable.	AP000465

Table 1-1 – Main System Diagram Key

2. Getting Started

2.1 Identifying your Device

There are two types of device described in this User Guide.



This is a **PRORXD 1 RU Receiver.**

Its type designation is: **PRORXD-n-1RU**

Where n is 2 or 4-way diversity.

Dimensions (mm): 320 (L) x 220 (W) x 44 (H).

Weight: TBC kg.

Operating Temperature: -20 degrees C to +60 degrees C.

DC Input 6 to 26VDC Reverse Polarity Protected

Power Consumption:

27-49W (Downconverter dependant).



This is a **PRORXD 2 RU Receiver.**

Its type designation is: **PRORXD-n-2RU**

Where n is 2, 4, 6 or 8-way diversity.

Dimensions (mm): 320 (L) x 220 (W) x 88 (H).

Weight: TBC kg.

Operating Temperature: -20 degrees C to +60 degrees C.

DC Input 6 to 26VDC Reverse Polarity Protected

Power Consumption:

27-49W (Downconverter dependant).

Figure 2-1 – PRORXD Receiver Showing Rear Panel

2.2 Unpacking your PRORXD

Carefully open the packaging and remove the device. Make sure that all the components have been included in the package as shown in the packing list. Look for shipping damage.

Keep the packing list and all the packing materials for storage.

The codes on the picture mean:

- CA – Cable Assembly
- SA – Sub Assembly
- AP – Assembly Part.

The codes are useful if you buy a new cable in the future.

Diagram: Unpacking your PRORXD-1RU

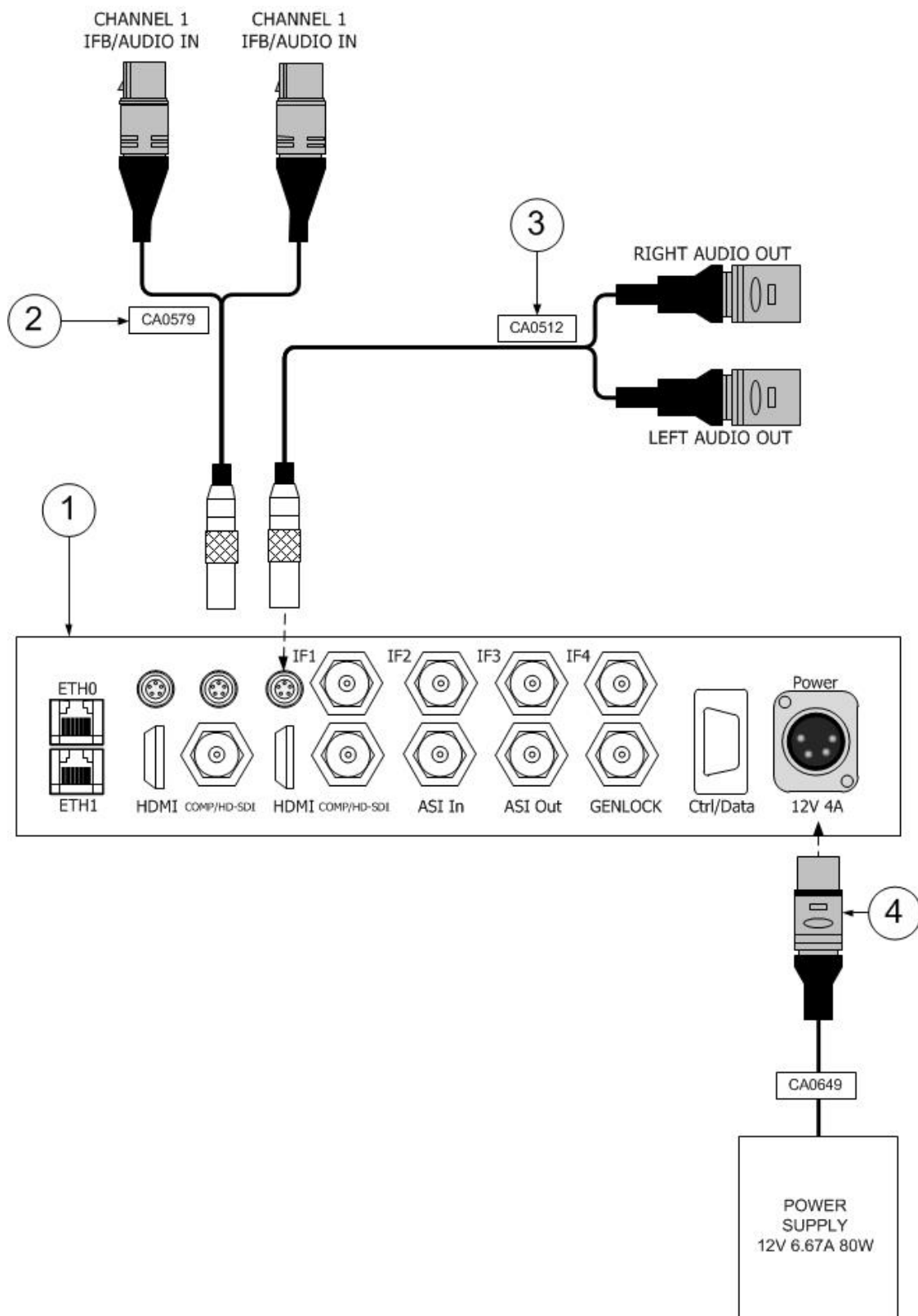


Figure 2-2 – PRORXD-1RU Packing Diagram

No	Item	Notes
1	Primary Unit.	PRORXD-2-1RU for example, 2-way diversity, DVBT demodulation, includes MPEG2 and H.264 SD decoder, Composite and SDI out, Genlock, Web-browser interface, with BNC connectors, excludes antennas and down converters.
2	HDTX External XLR Audio Cable Assembly 3 metres.	CA0579 Audio Cable Assembly (3 metres) Lemo OB 5-way plug (pins) to XLR 3-way plug, sockets (left audio) XLR 3-way plug, sockets (right audio).
3	Pro-RXB External XLR Audio Cable Assembly 2 Metres.	CA0512 Lemo OB 5-way plug (pins) to XLR 3-way plug, pins (left audio) XLR 3-way plug, pins (right audio).
4	Pro-RXB External 12V 6.67A 80W Desktop Power Supply Unit Assembly 1.165 Metres.	CA0649 Power Cable Assembly (3 metres) PSU Block to XLR 4-way plug (sockets) 12VDC.

Table 2-1 – Parts in the PRORXD Package

Diagram: Unpacking your PRORXD-2RU

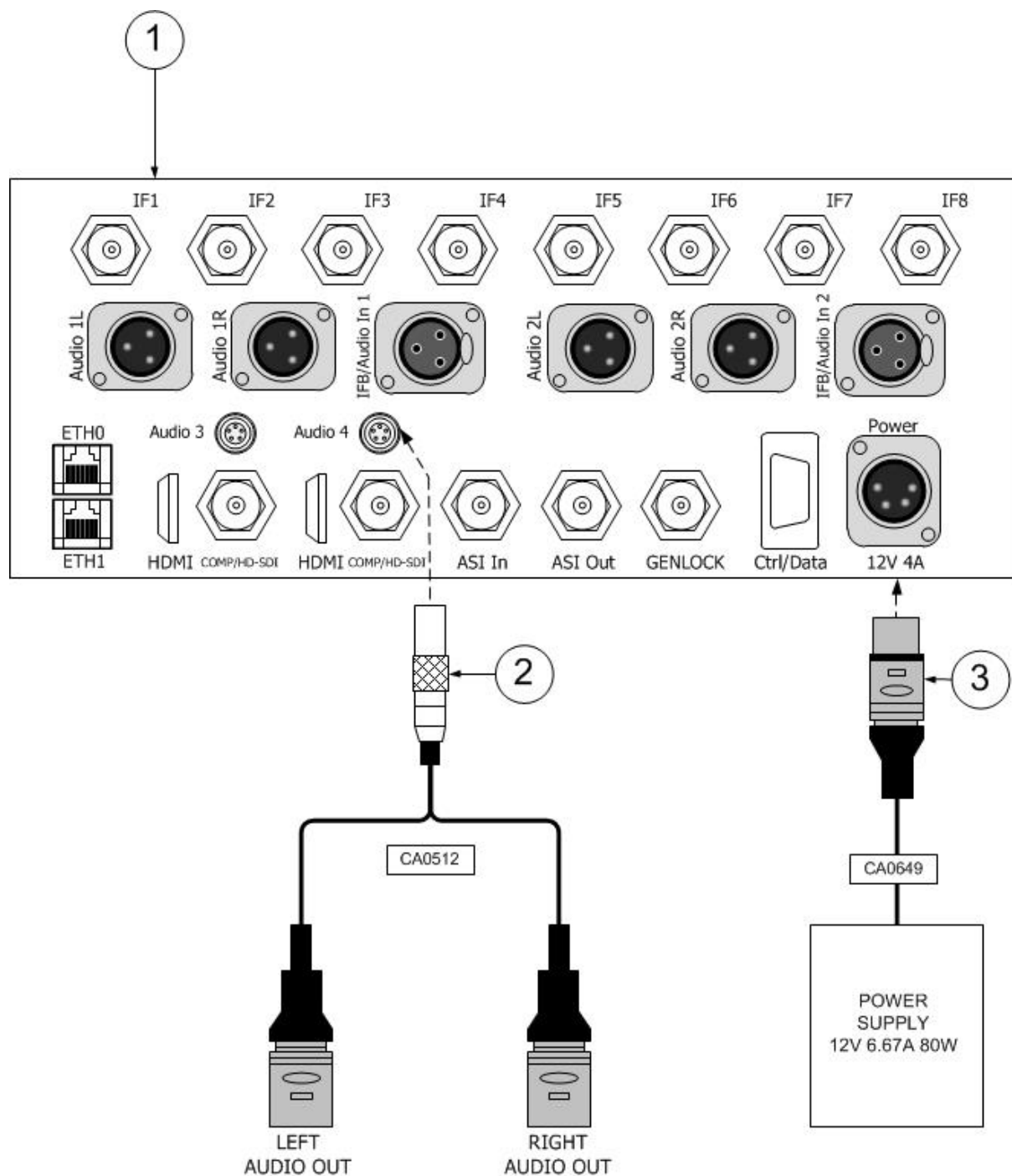


Figure 2-3 – PRORXD-2RU Packing Diagram

No	Item	Notes
1	Primary Unit.	PRORXD-2-2RU for example, 2-way diversity, DVBT demodulation, includes MPEG2 and H.264 SD decoder, Composite and SDI out, Genlock, Web-browser interface, with BNC connectors, excludes antennas and down converters.
2	Pro-RXB External XLR Audio Cable Assembly 2 Metres.	CA0512 Lemo OB 5-way plug (pins) to XLR 3-way plug, pins (left audio) XLR 3-way plug, pins (right audio).
3	Pro-RXB External 12V 6.67A 80W Desktop Power Supply Unit Assembly 1.165 Metres.	CA0649 Power Cable Assembly (3 metres) PSU Block to XLR 4-way plug (sockets) 12VDC.

Table 2-2 – Parts in the PRORXD Package

Troubleshooting

I don't have all the parts you described!

Tell your Cobham representative right away and we will find a solution for you.

The Cobham Centre – Solent Fusion 2 1100 Parkway, Solent Business Park Whiteley, Hampshire PO15 7AB, England	+44 (0)1489 566 750
---	---------------------

2.3 About the Labels on your PRORXD

Which model do I have? What is its Serial Number?

This topic contains information covering placards, labels, markings, etc., showing the part number, legend and location of each placard, label, or marking required for safety or maintenance important information.

Diagram: PRORXD Label

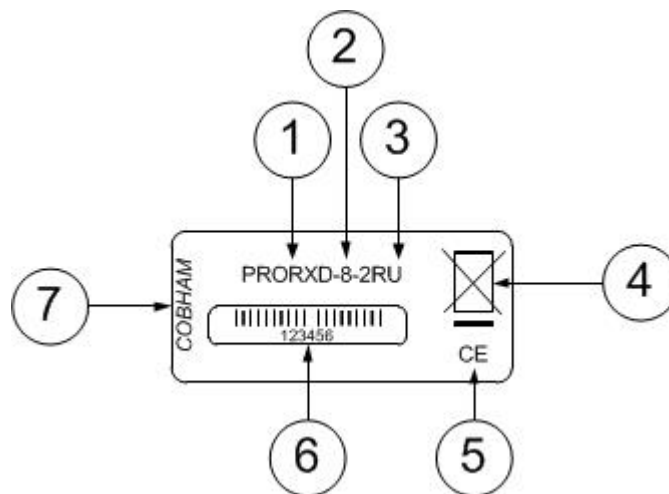


Figure 2-4 – PRORXD Label

No	Item
1	Professional Receiver Group.
2	Number of ways of diversity (eight in my example).
3	One or two rack unit version. (My example is 2RU).
4	Disposal mark.
5	<p>The CE marking (also known as CE mark) is a mandatory conformity mark on many products placed on the single market in the European Economic Area (EEA).</p> <p>The CE marking certifies that a product has met EU consumer safety, health or environmental requirements.</p>
6	Barcode with six digit serial number. This number will be necessary during a support call.
7	Manufacturer.

Table 2-3 – PRORXD Label Key

2.4 Planning the Hardware Installation

During the layout of the system, you must give careful consideration of the location of this and all other related modules. Some of the items to think about include:

- Space - Keep 100mm clearance to the rear for cable bending.
- How near to other devices (for example, source equipment).
- Length of cables.
- Environmental conditions (temperature, humidity, etc.)
- Access for repair.
- Compliance with local regulations.

2.5 Identifying the Variants of PRORXD

Step 1: Identify the Variants

Equipment Title	Part Number
SD/HD 2 x RF Input Receiver/Decoder	PRORXD-2-1RU
SD/HD 4 x RF Input Receiver/Decoder	PRORXD-4-1RU
SD/HD 2 x RF Input Receiver/Decoder	PRORXD-2-2RU
SD/HD 4 x RF Input Receiver/Decoder	PRORXD-4-2RU
SD/HD 6 x RF Input Receiver/Decoder	PRORXD-6-2RU
SD/HD 8 x RF Input Receiver/Decoder	PRORXD-8-2RU

Table 2-4 – PRORXD Variants

2.6 Identifying the Options of PRORXD-1RU

The PRORXD-1RU has **two** types of options:

- Accessory Options
- Licensing Options

Step 1: Identify the Accessory Options

Equipment Title	Part Number
1RU Full-width Rack Extender kit	
1RU Joining kit (joins 2 units to form full 19" rack-width)	

Table 2-5 – PRORXD-1RU Accessory Options

Step 2: Identify the Licensing Options

Equipment Title	Part Number
Adaptive bit-rate decoding (needs Cobham IP Encoder)	IP-ADBR
HD to SD down sampling	RX-HD2SD
Add DVB-T2 demodulation	RX-DVBT2
Enable 2nd decoder	RX-DEC2
Enables UML modulation	RX-UMVLIP
Narrowband 2.5MHz	RX-N

Table 2-6 – PRORXD-1RU Licensing Options

2.7 Identifying the Options of PRORXD-2RU

The PRORXD-2RU has **two** types of options:

- Accessory Options
- Licensing Options

Step 1: Identify the Accessory Options

Equipment Title	Part Number
2RU Full-width Rack Extender kit	
2RU Joining kit (joins 2 units to make full 19" rack-width)	

Table 2-7 – PRORXD-2RU Accessory Options

Step 2: Identify the Licensing Options

Equipment Title	Part Number
Adaptive bit-rate decoding (needs Cobham IP Encoder)	IP-ADBR
HD to SD down sampling	RX-HD2SD
Add DVB-T2 demodulation	RX-DVBT2
Enable 2nd decoder	RX-DEC2
Enable PoE (Power over Ethernet) on IP output	EX-POE

Table 2-8 – PRORXD-2RU Licensing Options

2.8 About the Software with your PRORXD

The PRORXD has **two** software elements:

- **Firmware** that operates on the primary board of the device.
- **Control Pages** that you operate on your web browser on your Windows PC.

About the Firmware

Although much of the unit is built up of hardware components, many of the sophisticated features are done in the firmware operating on a Field Programmable Gate Array (FPGA) in the device.

When you must do an internal software upgrade we can give you an installer which contains all the code to do this easily.

About the Control Pages

The software tools give users a convenient access to the most usual features and functions of the device. All software tools are implemented as a web interface. The advantage of a web interface is that it is independent from the user's operating system and it is not necessary to have special software on the host PC.

The Control Panel on the front of the unit gives access to many of the features of the radio but for more sophisticated operations and configuration tasks you'll connect up a PC operating a web browser to access the Control Pages on your PRORXD.

The Control Pages enables you to set up sixteen presets in the radio and have control of many parameters of the unit.

Here's what one of the PRORXD Control Pages look like:

Screenshot: PRORXD Control Page

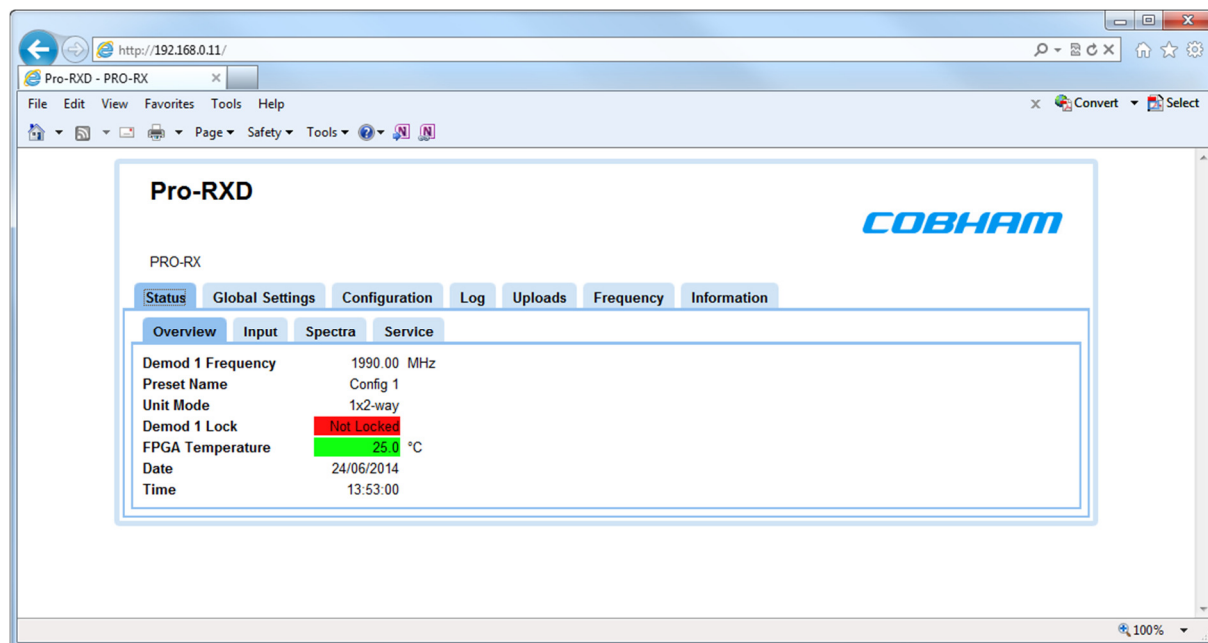


Figure 2-5 – PRORXD Control Page

3. Controls, Connections and Indicators

3.1 About Controls, Connections and Indicators

You must find all the **controls** and **connections** on the unit. You also must identify and interpret **alarms** or **indicators**. These topics will help you identify all these features.

The PRORXD has **front** and **rear** panels which contain all the interface connections for the unit and the controls and indicators. There is a control panel on the front of the unit.

3.2 Exploring the Front Panel – PRORXD-1RU

Diagram: Front Panel



Figure 3-1 PRORXD-1RU Front Panel

No	Item	Used for...
1	Rack Mounting Ears.	Metalwork that can be removed to let the PRORXD to be fitted in a half of a 19" rack. Two PRORXDs can be joined together to fill a full 19" rack with the 1RU Joining kit.

No	Item	Used for...
2	Display Screen.	This OLED display with the navigation keys lets you quickly set up many of the features of the PRORXD. You can see spectrum, RX SNR and RX Power for example.
3	Joystick / Confirm Button	Move the joystick for UP, DOWN, LEFT and RIGHT. Turn the joystick for selection. Short push the joystick for ENTER. Long push the joystick for BACK.
4	USB 4-way receptacle.	Used for Preset loading.
5	Power Button.	Toggles the power on or off.
6	BNC Receptacle.	Video output for monitoring.

Table 3-1 – PRORXD-1RU Front Panel Key

3.3 Exploring the Rear Panel – PRORXD-1RU

Diagram: Rear Panel

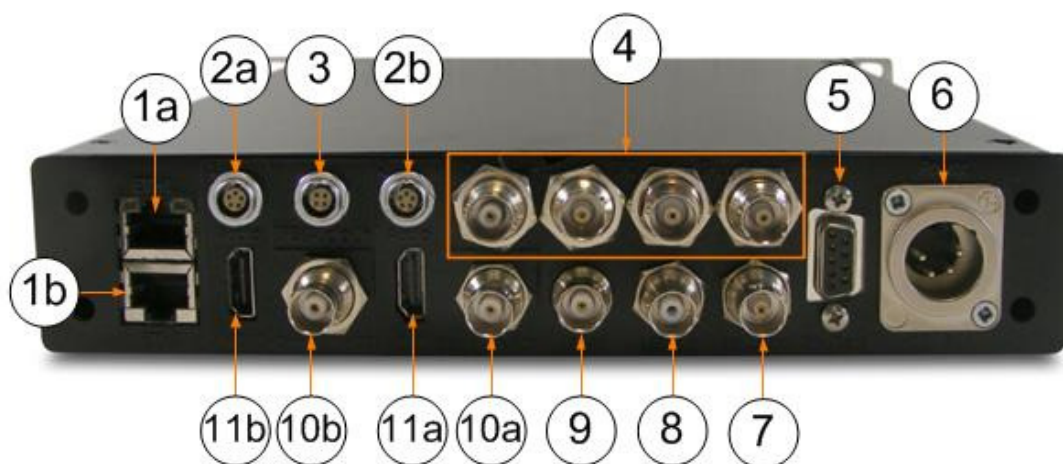


Figure 3-2 PRORXD-1RU Rear Panel

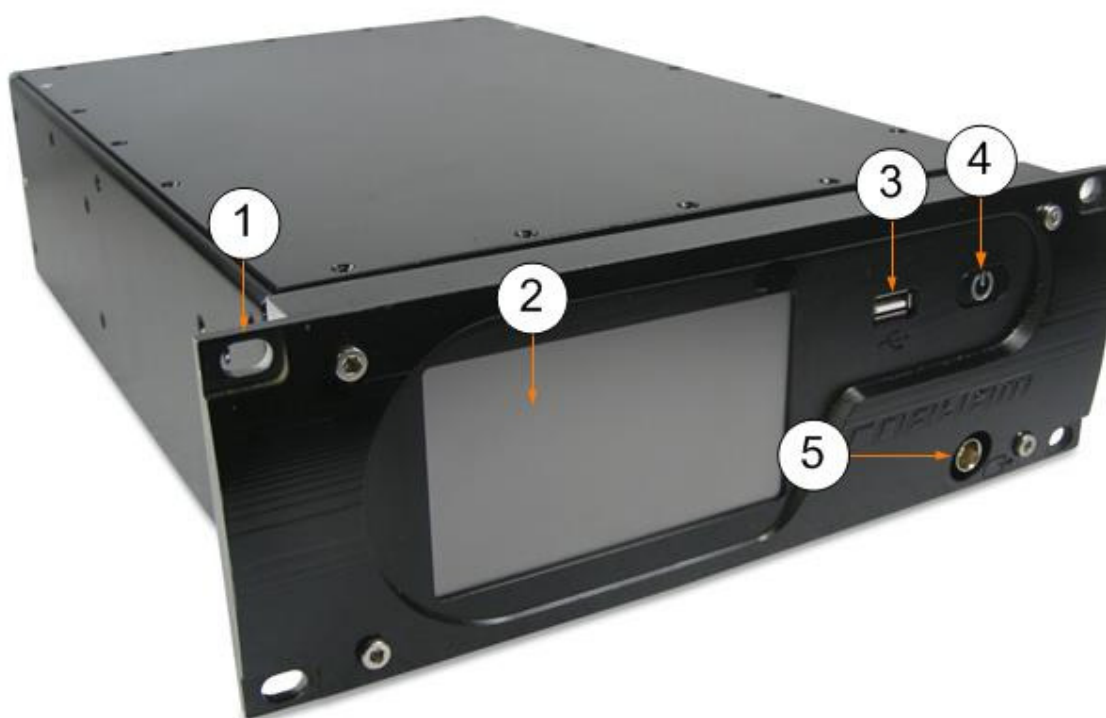
No	Item	Used for...
1ab	RJ45 8-way Receptacle, (sockets) marked ETH0 and ETH1.	Ethernet input / output. You will operate with this port to control your PRORXD by operating a web browser on your PC. It is also used for streaming video if your unit is licenced correctly.
2ab	Lemo OB 5-way receptacle (sockets) twin key marked 1, AUDIO. Channel two is marked 2, AUDIO.	For Audio output. Each channel has this facility.
3	Lemo OB 5-way receptacle (sockets) marked IFB/AUDIO IN.	IFB – Interruptible Fold back. The IFB is a special intercom circuit that consists of a mix-minus program feed sent to an earpiece worn by presenter via IP (audio that is being “fed back” to presenter) that can be interrupted and replaced by a television producer's or director's intercom microphone. That microphone is connected here.
4	BNC 2-way Receptacle (sockets) x 4 marked IF1 to IF4.	Connect your IF cables from the downconverter / antenna assembly here. Do not over tighten. Hand-tight only.
5	D-Type 9-way Receptacle, (sockets) marked CTRL/DATA.	RS232 Data/Control port. Data output. Also enables you to control the PRORXD serially if required.
6	XLR 4-way Receptacle, (pins) marked POWER, 12V 4A.	Power input to the PRORXD.
7	BNC 2-way receptacle (sockets) marked GENLOCK.	Connect your Genlock device to this port to keep the receiver synchronised with all the other equipment in your facility.
8	BNC 2-way receptacle (sockets) marked ASI OUT.	Lets you connect this receiver to other equipment in your operation at ASI level.

No	Item	Used for...
9	BNC 2-way receptacle (sockets) marked ASI IN.	Lets you connect this receiver to other equipment in your operation at ASI level.
10ab	BNC 2-way Receptacles, (sockets) marked COMP/HD-SDI.	CBVS/SDI/HD-SDI//ASI video output.
11ab	HDMI Type-A 19-way Receptacle, sockets marked HDMI.	HDMI (High Definition Multimedia Interface) output.

Table 3-2 – PRORXD-1RU Rear Panel Key

3.4 Exploring the Front Panel – PRORXD-2RU

Diagram: Front Panel

**Figure 3-3 PRORXD-2RU Front Panel**

No	Item	Used for...
1	Rack Mounting Ears.	<p>Metalwork that can be removed to let the PRORXD to be fitted in a half of a 19" rack.</p> <p>Two PRORXD's can be joined together to fill a full 19" rack with the 2RU Joining kit.</p>
2	Display Screen.	<p>This OLED display with the navigation keys let you quickly set up many of the features of the PRORXD.</p> <p>You can see spectrum, RX SNR and RX Power for example.</p>
3	USB 4-way receptacle.	Used for Preset loading.
4	Power Button.	Toggles the power on or off.
5	BNC Receptacle.	Video output for monitoring.

Table 3-3 – PRORXD-2RU Front Panel Key

3.5 Exploring the Rear Panel – PRORXD-2RU

Diagram: Rear Panel

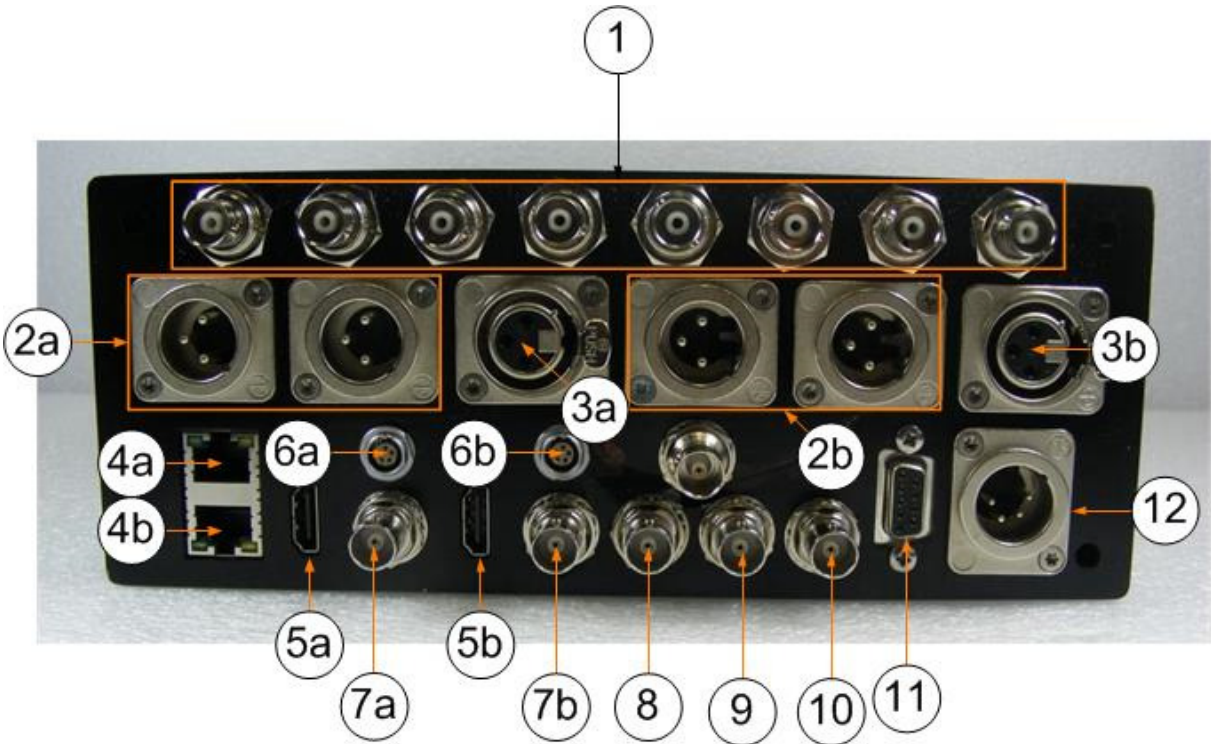


Figure 3-4 PRORXD-2RU Rear Panel

No	Item	Function
1	BNC 2-way receptacle (sockets), 50-850MHz marked IF1 to IF8.	The IF cables from the downconverters connect here. IF=Intermediate frequency.
2ab	XLR 3-way receptacle (pins) marked AUDIO 1L and AUDIO 1R. Channel two is marked AUDIO 2L and AUDIO 2R.	Stereo Line Level Audio Outputs, left and Right, channel one. Each channel has this facility.

No	Item	Function
3ab	XLR 3-way receptacle (sockets) marked IFB/Audio In 1. Channel 2 is marked IFB/Audio In 2.	IFB – Interruptible Fold back. The IFB is a special intercom circuit that consists of a mix-minus program feed sent to an earpiece worn by presenter via IP (audio that is being "fed back" to presenter) that can be interrupted and replaced by a television producer's or director's intercom microphone. That microphone is connected here. Each channel has this facility.
4ab	RJ45 8-way receptacle (sockets) marked ETH0 and ETH1.	Ethernet 1 and 2. 10/100/1G Ethernet Ports with PoE (Power over Ethernet) support. Used for Remote Control through a web browser and for streaming.
5ab	HDMI receptacle (sockets) marked HDMI.	HDMI Video output. Each channel has this facility.
6ab	Lemo OB 5-way receptacle (sockets) twin key marked AUDIO 3. Channel two is marked AUDIO 4.	For Audio output. Each channel has this facility.
7ab	BNC 2-way receptacle (sockets) marked COMP/HD-SDI.	CBVS/SDI/HD-SDI//ASI video output.
8	BNC 2-way receptacle (sockets) marked ASI IN.	ASI Input
9	BNC 2-way receptacle (sockets) marked ASI OUT.	ASI Output
10	BNC 2-way receptacle (sockets) marked GENLOCK.	Genlock Input.
11	D-Type 15-way receptacle (sockets) marked CTRL/DATA.	RS232 Control from PC GUI Application. RS232 Data Output, 1K2 to 115K2 baud switchable.
12	XLR 4-way receptacle (pins) marked POWER, 12V 4A.	6 to 26V Reverse Polarity Protected Power from AC Adapter.

Table 3-4 – PRORXD-2RU Rear Panel Key

4. Setting up your PRORXD

4.1 Connecting the Antennas

This topic describes connecting systems designed mainly for transporting the RF signals. Of all the variables affecting single-channel radio communications, the one cause that an operator has the most control with is the antenna. With the right antenna, an operator can change a marginal net into a reliable net.

There are **eight** antenna interfaces located on the rear panel of the PRORXD-8-2RU receiver for example. The PRORXD-2-1RU uses two.

Note: If you have four-way diversity PRORXD then you **must** connect **four** antennas to get best performance from the four-way diversity receiver system.

If you have six-way diversity PRORXD then you **must** connect **six** antennas to get best performance from the six-way diversity receiver system.

If you have eight-way diversity PRORXD then you **must** connect **eight** antennas to get best performance from the eight-way diversity receiver system.

Before you Start

This is necessary:

- 2, 4, 6 or 8 downconverters that align with the frequency range you wish to receive.
- 2, 4, 6 or 8 antennas that align with the frequency range of your downconverters.

CAUTION: Do not turn the **barrel** of the downconverter when attaching antennas or IF cables. Too much twisting force will damage the inner pin.

CAUTION: Do not install the Downconverter **upside down**. Power from the IF cable will damage components in the downconverter.

Step 1: Select your Downconverters

All PRORXD receivers operate with downconverters to lower the frequency from microwave (L, S and C-Band) to an Intermediate Frequency (IF) between 51 and 858MHz that the on-board tuners in the receivers can operate with.

It is important to select the correct downconverter for the microwave transmission frequency you are planning to receive. Downconverters have a label to help you select the correct unit.

If you are operating with long cable runs from the bottom of the downconverter to the rear panel of the PRORXD, it will be necessary to select a high gain version of the downconverter to deal with the RF losses in the longer cable. Some downconverters are switchable between high and low gain.

Step 2: Attach the Antennas to the Downconverters

1. Connect each antenna directly to the TNC Receptacle on the top panel of each downconverter.
2. Do not tighten the antenna too much – tighten with your hand.

Step 3: Set Antenna Polarization

1. COFDM links are very robust and are tolerant to changes in antenna location, but, it is important to try and keep the antennas in the **same plane** if possible.
2. The antennas used with the COFDM links are usually **linearly** polarized.

Step 4: Attach IF Cable to the Downconverter

1. Connect the TNC plug on the IF Cable to the TNC Receptacle on the bottom panel of each downconverter.
2. Do not tighten the TNC connector too much – tighten with your hand.

Step 5: Attach IF Cable to the PRORXD

1. Connect the BNC plug on the IF Cable to the BNC Receptacle on the rear panel of the PRORXD. They are marked IF1 to IF8.

Next Steps

Connect AC Power.

4.2 Connecting AC Power

Before you Start

This is necessary:

- A CA0649 Pro-RXB External 12V 6.67A 80W Desktop Power Supply
- PRORXD.

Step 1: Connect the AC Power

1. Connect the **XLR 4-way plug** (sockets) from the AC adaptor to the **XLR 4-way Receptacle** (pins) on the PRORXD Receiver which is located on the right side of the rear panel and marked POWER, 12V 4A.
2. At this time, connect the **IEC mains 3-way plug** (sockets) to the **IEC mains 3-way Receptacle** (pins) on the AC adaptor.
3. Connect IEC mains plug to your **local AC supply** and switch it on.

Next Steps

Connect Video Signals.

4.3 Connecting Composite Video Signals

Before you Start

This is necessary:

- PRORXD
- CA0006 BNC to BNC Video Cable Assembly
- A Composite approved Video Monitor.

Step 1: Connect Composite Video Signal

1. Connect the BNC 2-way plug to the BNC 2-way receptacle of the PRORXD marked COMP/HD-SDI. (You can operate with channel 1 or 2).
2. Connect the other BNC 2-way plug to a composite approved video monitor.

4.4 Connecting HD-SDI Video Signals

Before you Start

This is necessary:

- PRORXD
- CA0006 BNC to BNC Video Cable Assembly
- An HD-SDI approved Video Monitor.

Step 1: Connect SDI Video Signal

1. Connect the BNC 2-way plug to the BNC 2-way receptacle of the PRORXD marked HD-SDI.
2. Connect the other BNC 2-way plug to the HD-SDI approved video monitor.

4.5 Connecting Audio Signals with XLR Connectors

Before you Start

This is necessary:

- PRORXD
- XLR Audio Cable Assembly
- Audio monitors like loudspeakers or headphones.

Step 1: Connect Audio Signal

1. With the XLR Audio cable, connect the XLR 3-way plug (sockets) to the XLR 3-way receptacle (pins) of the PRORXD marked AUDIO 1L for example.
2. Connect the other XLR 3-way plug to the audio monitors you wish to operate for channel 1 left audio.

4.6 Connecting Audio Signals with CA0512 Cable

Before you Start

This is necessary:

- PRORXD
- CA0512 Audio Cable Assembly
- Audio monitors like loudspeakers or headphones.

Step 1: Connect Audio Signal

1. Connect the Lemo OB 5-way plug to the Lemo OB 5-way receptacle of the PRORXD marked AUDIO 3 for example.
2. Connect the XLR 3-way plugs to the audio monitors you wish to operate for channel 1 left and right audio.

4.7 Connecting Data Signals

Before you Start

This is necessary:

- PRORXD
- CA0511 Data Cable Assembly (optional).
- A Data monitor.

Step 1: Connect Data Signal

1. Connect the D-Type 15-way plug to the D-Type 15-way receptacle of the PRORXD marked CTRL/DATA.
2. Connect the D-Type 9-way plug marked DATA1 or DATA2 to the data monitor.

4.8 Connecting Serial Control Signals

Before you Start

This is necessary:

- PRORXD
- CA0511 Data Cable Assembly
- A Personal Computer.

Step 1: Connect Serial Control Signal

1. Connect the D-Type 15-way plug to the D-Type 15-way receptacle of the PRORXD marked CTRL/DATA.
2. Connect the D-Type 9-way plug marked CONTROL to the PC.

4.9 Connecting IP Control Signals

Before you Start

This is necessary:

- PRORXD
- Ethernet Cable Assembly
- A Personal Computer.

Step 1: Connect IP Control Signal

1. Connect the RJ45 8-way plug to the RJ45 8-way receptacle of the PRORX marked ETH0.
2. Connect the other RJ45 8-way plug to the RJ45 8-way receptacle on your PC.

5. Basic Operation

5.1 Starting and Stopping the PRORXD

PRORXD units have a power switch on the right side of the front panel.

Before you Start

This is necessary:

- A PRORXD connected to a source of power.

Step 1: Powering Up

1. Push the Power Switch on the front panel.
2. You'll see the Splash display.
3. Let the unit Initialise.

Step 2: Shutting Down

It is important to shut down the system carefully. This ensures that all processes are terminated correctly and no data or settings are lost.

1. Push the Power Switch on the front panel.
2. The display will go off.
3. The system is shut down safely.

Next Steps

Explore the Control Panel.

5.2 Exploring the Control Panel – 1RU

When you have powered up the PRORXD you'll see the control panel located on the front panel.

Before you Start

This is necessary:

- A fully powered PRORXD

Diagram: Control Panel



Figure 5-1 PRORXD – 1RU Control Panel

No	Item	Used for...
1	Display Screen.	<p>This OLED display with the navigation keys let you quickly set up many of the features of the PRORXD.</p> <p>You can see spectrum, RX SNR and RX Power for example.</p>
2	Joystick / Confirm Button	<p>Move the joystick for UP, DOWN, LEFT and RIGHT.</p> <p>Turn the joystick for selection.</p> <p>Short push the joystick for ENTER.</p> <p>Long push the joystick for BACK.</p>

Table 5-1 – Control Panel Key

6. Advanced Operation

6.1 About Encryption

The target is focused on intercepting your radio signal. To do this, all that is necessary is a radio receiver that operates in the same mode and on the same frequency you are using to transmit. The fact that you are operating gives them valuable information. It tells them that you are in the area and by the number of stations operating on the same frequency they can estimate the dimensions of the operation against them. If your radio net is operating in the clear, the target specialists can see or hear fully what is being transmitted for more information. When analysing the traffic patterns, the target can understand which location is the net control post and identify the headquarters.

6.2 Setting up Encryption

If AES scrambling has been purchased for the SOLO system, then it is possible to encrypt the link. AES128 and AES256 are licence-controlled features. It will be necessary to encrypt the traffic leaving the transmitter and set up the receiver for decrypt.

Note: The word **Encryption** applies to the full procedure of encryption and decryption. We will use the word encryption for this receiver manual though what is actually going on here is a decryption procedure.

Before you Start

This is necessary:

- A fully powered PRORXD.
- The correct license loaded on the PRORXD for Encryption.
- A Personal Computer connected to the PRORXD configured to browse the Control Pages.

Step 1: Select the Encryption Mode

1. Click on the **Configuration** tab.
2. In the **Descrambling Mode** drop-down box click the drop-down arrow and select an encryption type. (AES128 in my example).
3. Click the **Apply** button.
4. The **Configured Successfully** message box opens.
5. Click the **OK** button.

Screenshot: Select the Encryption Mode

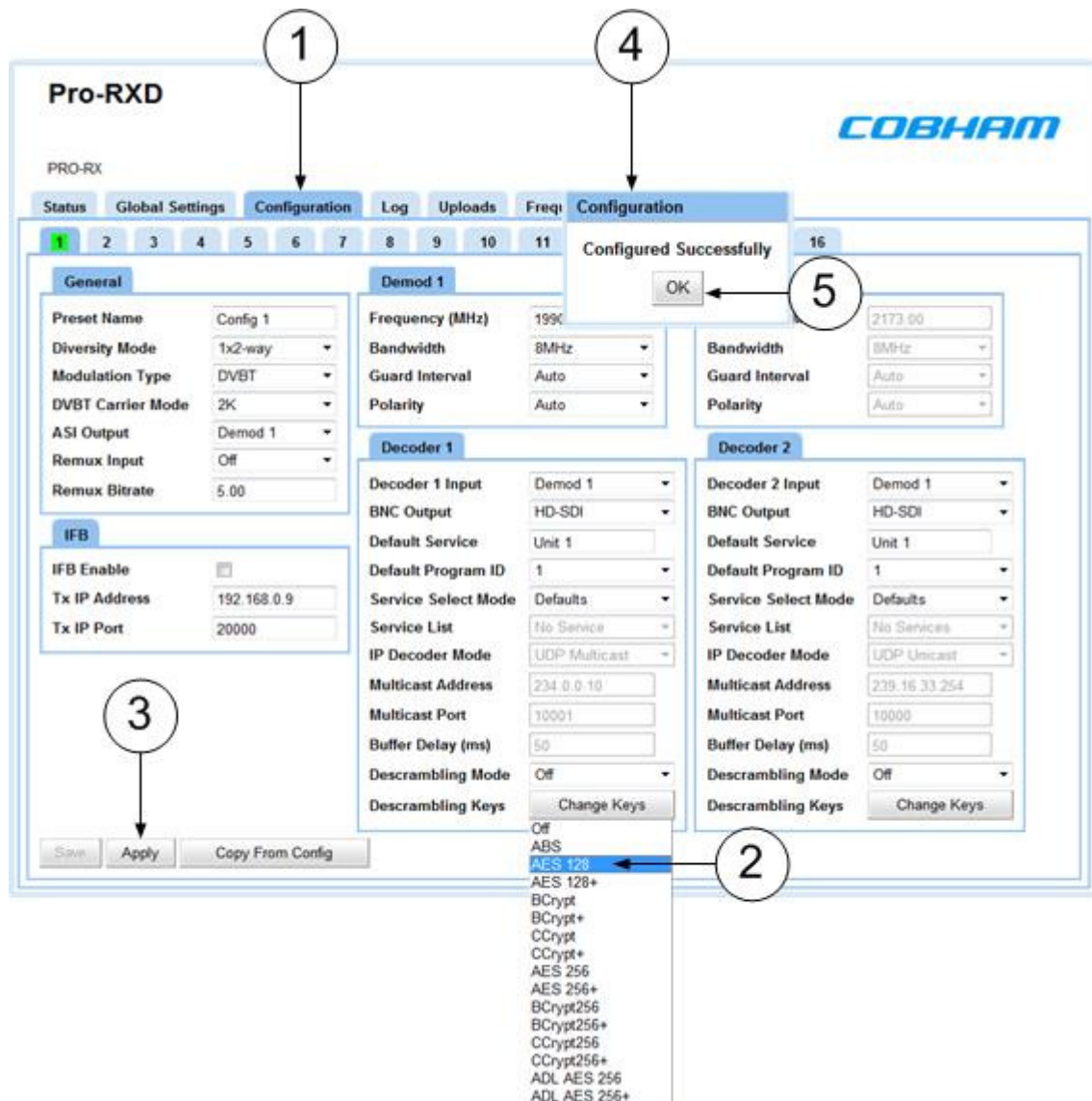


Figure 6-1 Select the Encryption Mode

Step 2: Change the Descrambling Keys

The **encryption key** is a 128bit value for AES128 and a 256bit value for AES256, and is entered as 32 or 64 ASCII hexadecimal characters (0..9, A..F).

1. Click on the **Configuration** tab.
2. Click the **Change Keys** button.
3. The **Enter Scrambling Key** dialog box opens.
4. In the **Key Type** drop-down box click the drop-down arrow and select the key type you are trying to write. (must align with the key type you chose in *Select the Encryption Mode* above).

5. In the **AES128 key** text box, type the encryption key you wish to use.
6. Click the **OK** button.
7. The **Scrambling Key Set** box opens.
8. Click the **OK** button.

Screenshot: Change the Encryption Key

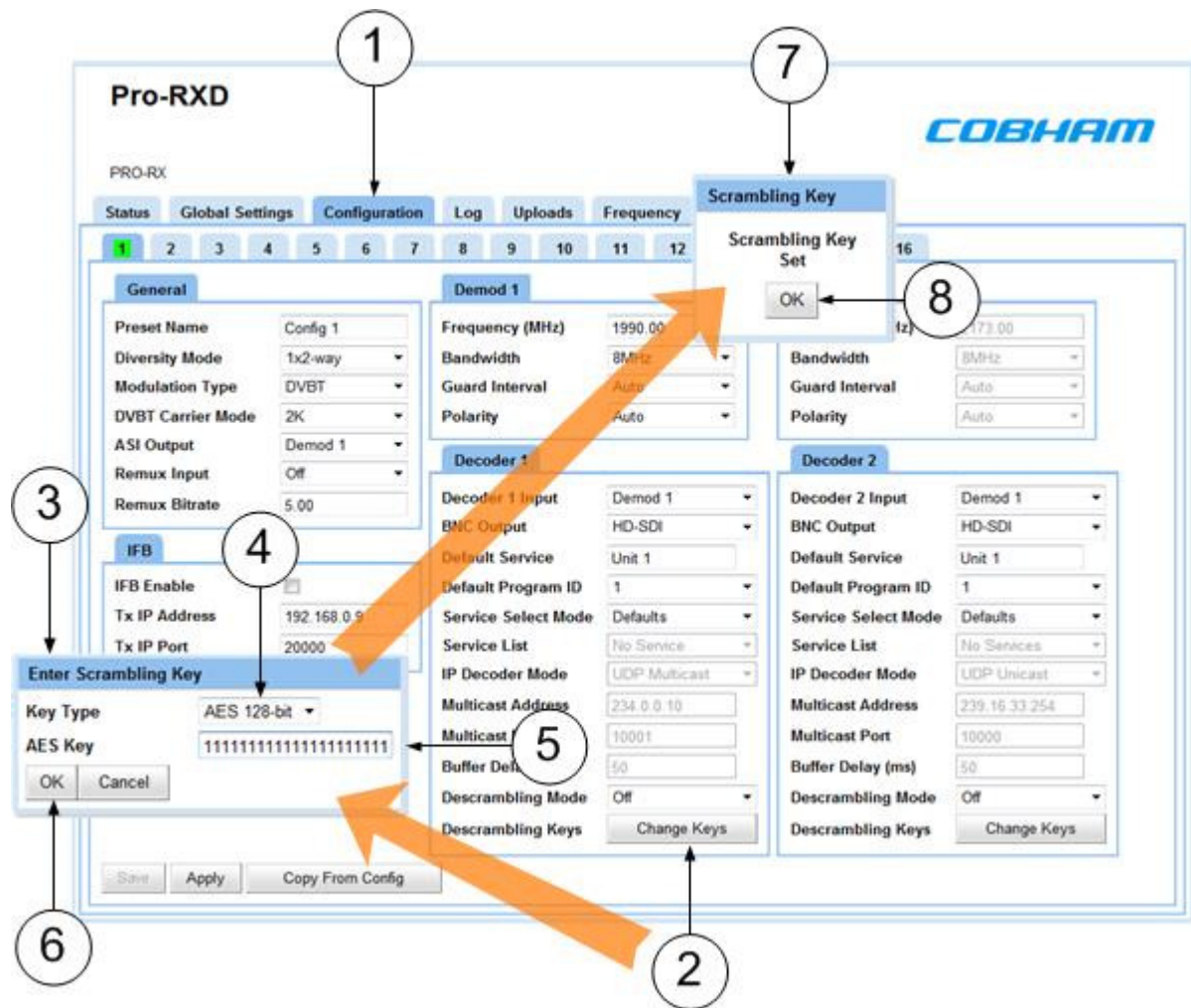
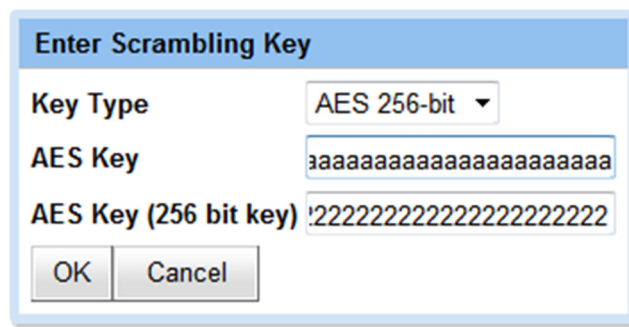


Figure 6-2 Change the Encryption Key

6.3 About the Encryption Key Characters Required

In our example above we used AES128 encryption. This needed a key of 32 characters. If we had chosen AES256 it needs a 64 character key which we apply along two fields.

**Figure 6-3 Encryption Key for AES256**

Key Type	Number of Characters Needed
ABS	8
AES128	32
AES256	64 (32 in each field)

Table 6-1 – Encryption Key Characters Required

6.4 About Streaming Along IP

Note: This section is related only to customers that have the Streaming licence loaded onto their PRORXD unit.

Streaming is the transmission of digital audio or video or the listening and viewing of such data without first storing it.

The PRORXD supports:

- Raw Multicast streaming
- RTSP/RTP streaming.

6.5 Configuring UDP Multicast Streaming

When you have got a Video or Audio service into the PRORXD, you could wish to stream that information down a fixed IP link.

For multicast streaming the transport stream video data is transmitted along the Ethernet network by means of multicasting i.e. continuous real-time streaming of packets that can be accessed by a PC connected to the network.

It is thus possible for more than one connected PC to see the streamed data at the same time.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.

- To be logged on to the PRORXD unit.
- The PRORXD must have a Streaming licence installed.
- Have a video transmission being received on Demod 1 of your PRORXD.

Step 1: Open the Global Settings Tab

1. Click on the **Global Settings** tab.
2. Find the **Streaming Settings** Pane.

Step 2: Configure the IP Settings Pane - Gateway

For multicast operations it is very important that you configure the **gateway** in the IP settings pane. It is not necessary to actually have a gateway in our network.

1. You must use an IP address in the same network range as the PRORXD and for simplicity; we recommend you use the actual PRORXD IP Address for your Gateway too.

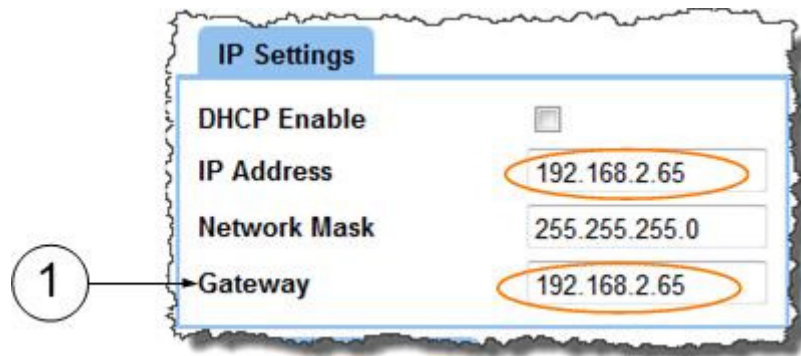


Figure 6-4 Configure the Gateway in the IP Settings Pane

Step 3: Configure the Streaming Settings

1. Check the **Streaming Enable** checkbox.
2. In the **Streaming Mode** box select **UDP Multicast**.
3. In the **Streamer Select** box select the source you wish to stream (**Demod 1** in my example).
4. In the **Multicast Address** box set **239.16.33.254**.
5. In the **Multicast TTL** box set 10.
6. In the **Multicast Port** box set 10000.
7. In the **Multicast Service Name** box set 10000.
8. In the **Multicast ToS** box set Routine (0).
9. Click the **Apply** button.
10. The **Configured Successfully** message opens.

11. Click the **OK** button.

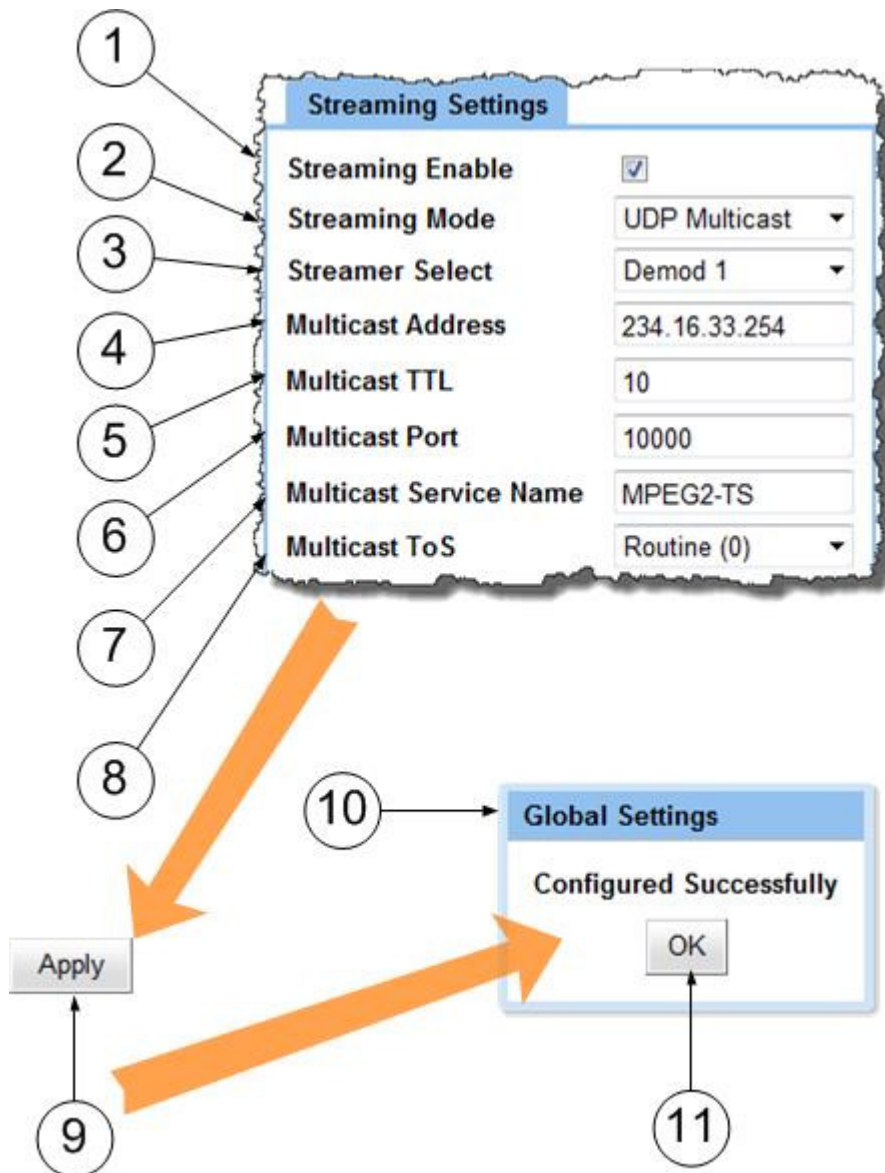


Figure 6-5 Configure the Streaming Settings Pane

6.6 Recovering a UDP Multicast Stream - VLC

You have configured your multicast stream at the PRORXD. You will wish to collect that stream on your PC. We'll operate VLC Media Player for this example as it is free to download from the internet.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.
- The PRORXD must have a UDP Multicast Stream Configured.
- Your PC must have VLC loaded.

Step 1: Open VLC

1. On your desktop, double-click the **VLC Media Player** Icon.
2. The **VLC Media Player** window opens.

Step 2: Configure the Playback

3. From the **Media** menu, select **Open Network Stream**.
4. The **Open Media** window opens.
5. Type the Network URL in this format: `udp://@234.16.33.254:10000`
6. Click the **Play** button.
7. Your **stream** will start playing in a new window.

Screenshot: Recovering a UDP Multicast Stream

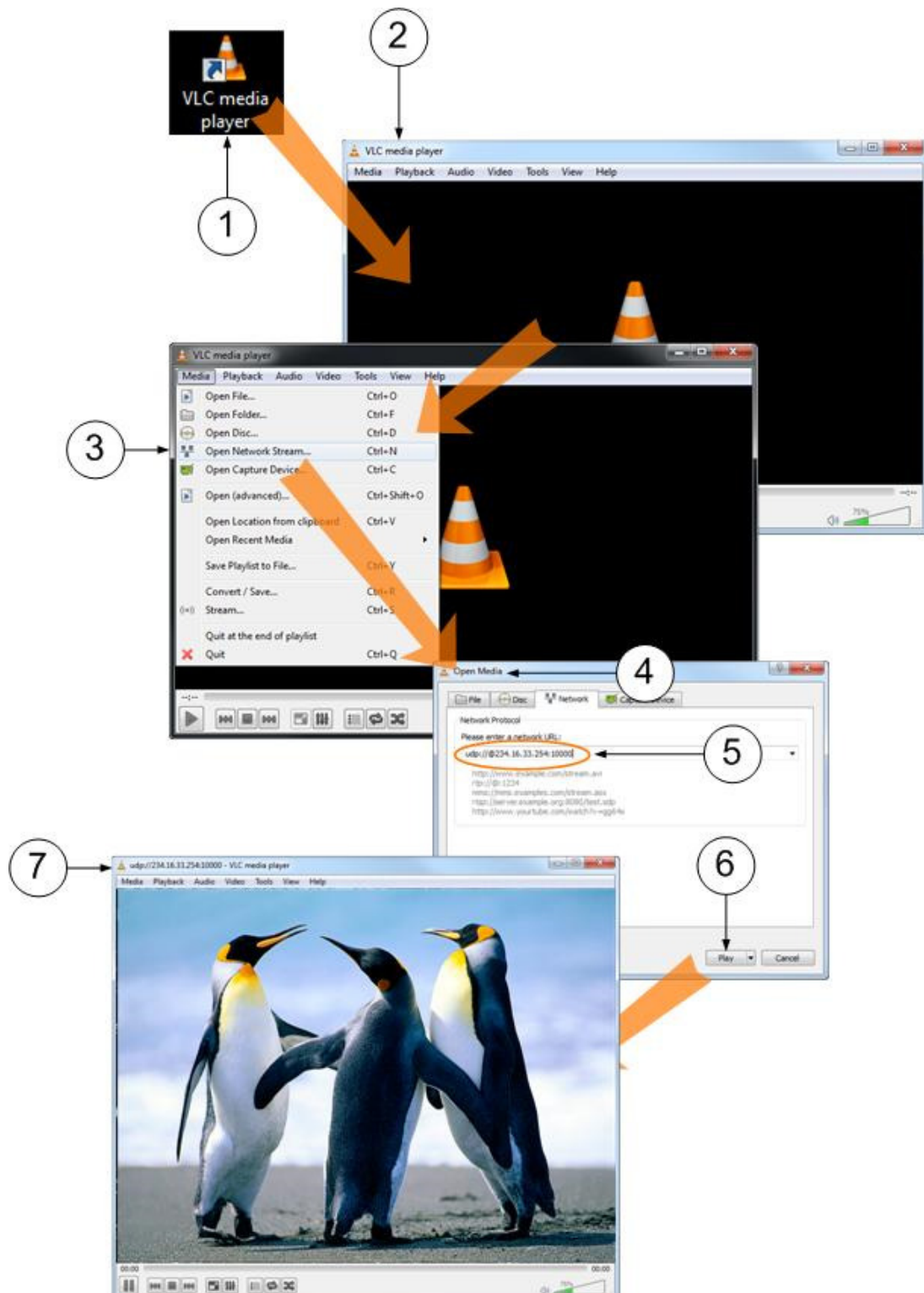


Figure 6-6 Recovering a UDP Multicast Stream - VLC

6.7 Recovering a UDP Multicast Stream – Mission Commander

You have configured your multicast stream at the PRORXD. You will wish to collect that stream on your PC. We'll operate Mission Commander for this example.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.
- The PRORXD must have a UDP Multicast Stream Configured.
- Your PC must have Mission Commander loaded.

Step 1: Open Mission Commander

1. On your desktop **double-click** the **Mission Commander Icon**.
2. The **Mission Commander** window opens.

Step 2: Open the Video Player

3. From the **Tree pane**, select **Devices**.
4. From the **Details pane**, select **Video Player**.
5. Click the **Add Device** button.
6. The Details pane switches to **Video Player**.

Step 3: Configure the Video Player

7. In the **Source** drop-down box select **Manual**.
8. Type the **URL** in the format: `udp://@234.16.33.254:10000`
9. It is not necessary to have a **Service Name**.
10. Keep **Encryption** to **None** for this example.
11. Set the **Interface** box to be the Local Area Connection you are using to connect the PC to the PRORXD.
12. Make sure the **Video Window** checkbox is **selected**.
13. Click the **Connect** button.
14. Your **stream** will start playing in the **Video Player** window.

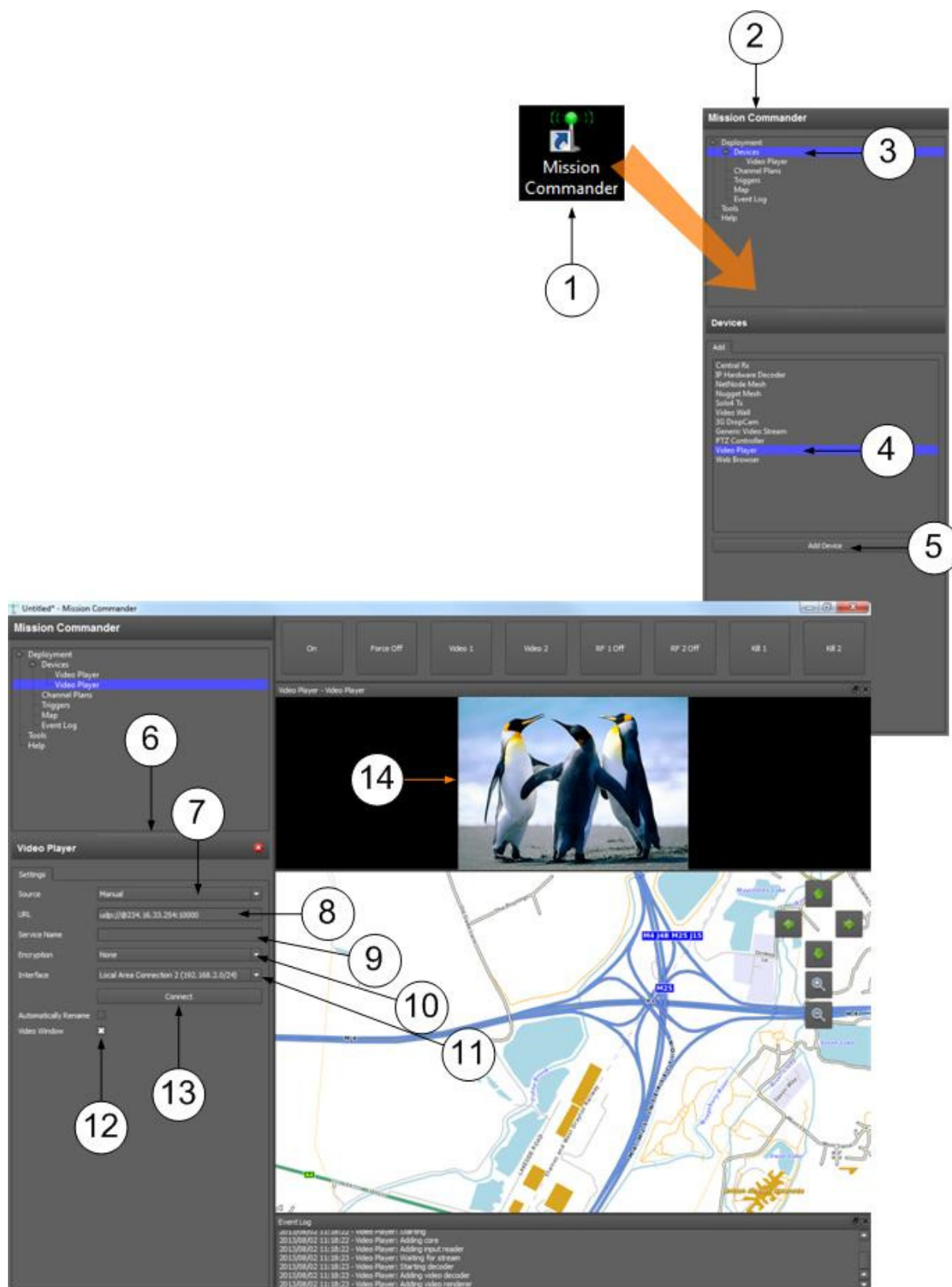


Figure 6-7 Recovering a UDP Multicast Stream – Mission Commander

6.8 About RTSP Multicast and Unicast

If you set the streaming mode on the PRORXD to be RTSP Multicast or RTSP Unicast then the Network URL that will be necessary in VLC or Mission Commander will be:

`rtsp://192.168.2.65/stream1.sdp`

The IP address here is that of the PRORXD you are streaming from.

If you were operating the second streamer on the PRORXD then the last component of the URL is: `stream2.sdp`.

7. Advanced Setup

7.1 About Advanced Setup

To get the most from your radio system you must customise the programming for your operations and area.

CAUTION: Before you start programming your radio make sure the batteries are new and fully charged. If not, you could operate an AC adapter to power your radio.

If the radio loses power while you program it, its memory might be corrupted and it will be necessary to reset defaults. All information programmed in the radio might be lost.

The **Control Application** or **Control Pages** let you control the communication system, to keep it operating in a correct and stable mode. It lets you to change many of the settings of the unit like frequency or bandwidth.

The control system can be a **Control Application** that operates on your PC connected to the device using Serial communications.

If not, it can be **Control Pages** that are viewed on your PC browser when connected to the device using IP communications.

The PRORXD Receiver uses **Control Pages** accessed from your web browser which enables you to do many configuration tasks quickly and easily. These next topics tell you how to connect your PC to the receiver and then operate your browser to configure the unit.

7.2 Installing the Browser Application on your PC

Note: Most PCs have a browser installed. This topic will only be necessary if you wish to change to a different browser.

Before you Start

This is necessary:

- A PC operating Windows 7 or better.
- The PC to have a network card configured for a fixed IP Address.
- The Browser Application you wish to operate. (Internet Explorer or Firefox for example).

Step 1: Install the Browser Application on your PC

1. Install Browser on your desktop or other convenient location on your PC.
2. Make sure you have a Browser start-up icon on your desktop to start the program.

Next Steps

Connect the PRORXD to your PC with an IP connection.

7.3 Connecting your PC to the PRORXD with IP

You'll wish to configure your PRORXD to do useful operations immediately.

The PRORXD has **Control Pages** accessed from your web browser which let you do many configuration tasks quickly and easily.

Before you Start

This is necessary:

- A PC with a web browser.
- An Ethernet cable.
- A powered PRORXD unit.
- The IP Address of the PRORXD unit.

Step 1 - Install the Web Browser Application on your PC

1. Make sure you have installed a **browser** (Internet Explorer, Firefox or Chrome for example) onto your Personal Computer (PC).

Step 2: Make an IP Connection between PRORXD and the PC

1. Connect the RJ45 8-way plug (pins) on the Ethernet Cable to the RJ45 8-way Receptacle (sockets) on the PRORXD receiver marked ETH0.
2. Connect the RJ45 8-way plug (pins) on the Ethernet Cable to the RJ45 8-way Receptacle (sockets) of your Personal Computer.

Step 3 - Open your Web Browser and Log on

1. On your PC, double-click your **Internet Browser** icon.
2. The Web browser **Home Page** window **opens**.
3. In the **Address bar**, type the **IP Address** of the PRORXD you want to configure like this example: `http://192.168.2.65/`
4. Your PRORXD **Control Page** opens in your Web Browser.

Screenshot: Open Web Browser and Log on

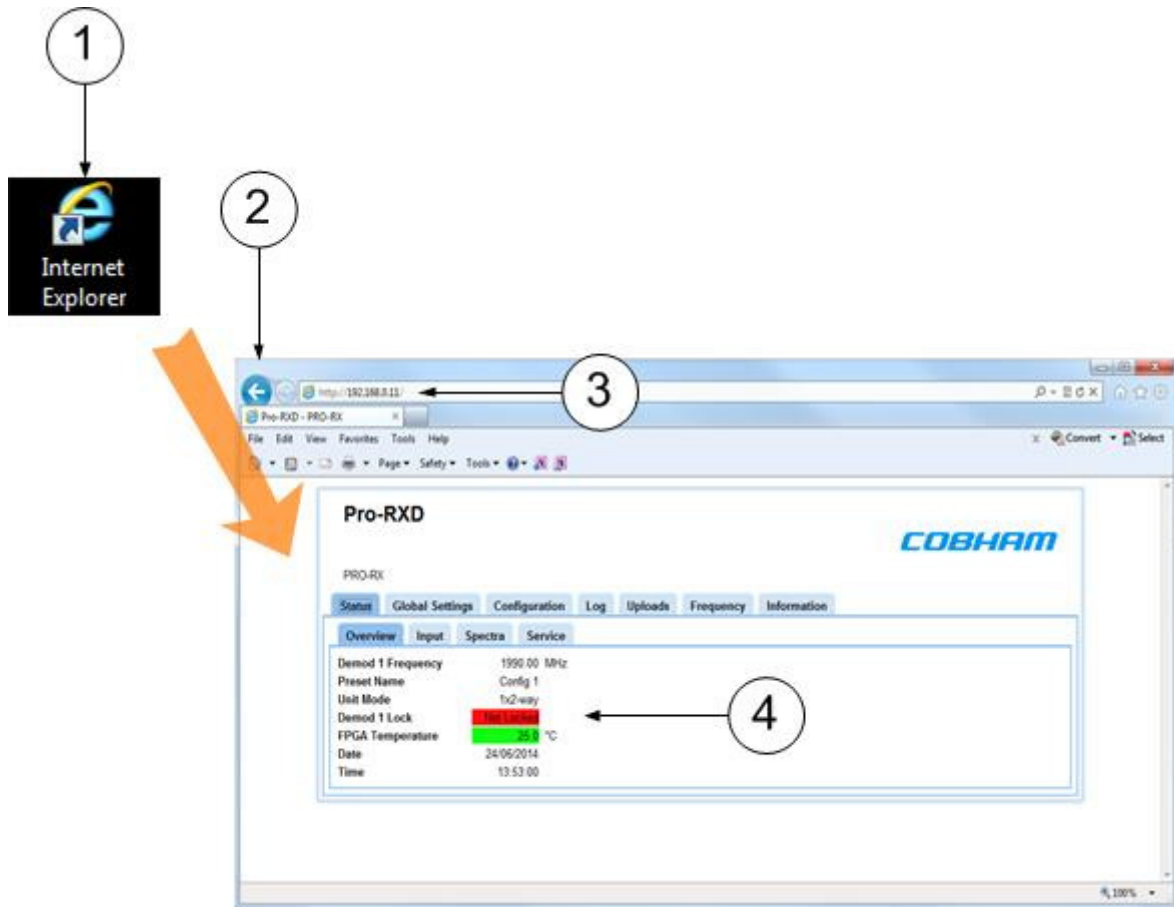


Figure 7-1 Open Web Browser and Log on

Troubleshooting

- ☹ I don't know the IP address of the unit.
- ☺ You'll find the IP Address on the front panel **Config>Global Setup>IP Address** page.
- ☹ I got the unit out of the box and it's in DHCP mode.
- ☺ You can toggle DHCP to OFF on the front panel **Config>Global Setup>DHCP** page

Next Steps

Explore the Primary Window.

7.4 Exploring the Primary Window

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Screenshot: Explore the Control Pages

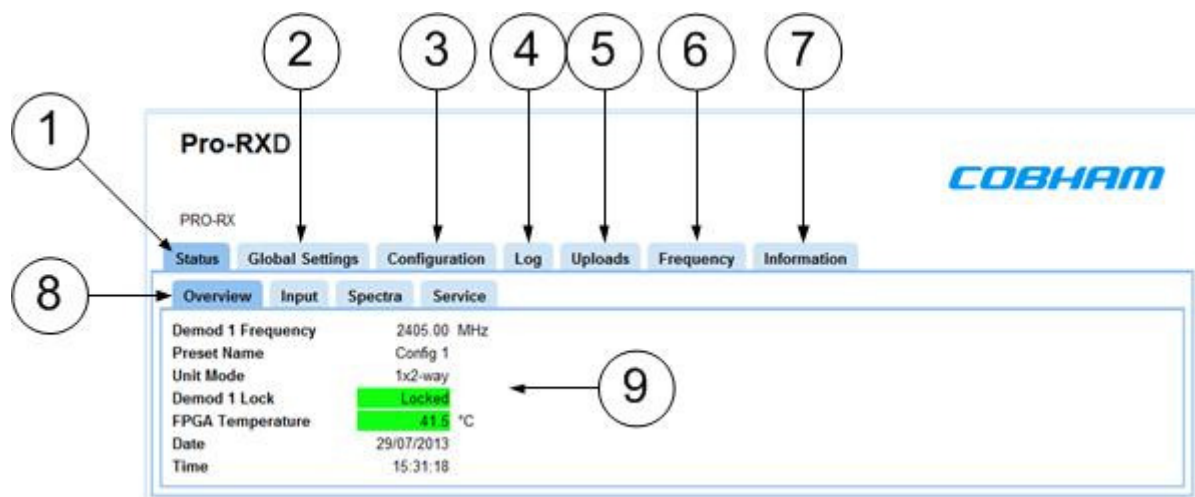


Figure 7-2 Explore the Control Pages

No	Property	Description
1	Status tab	Divided into Overview, Input, Spectra and Service sub-tabs. This displays detailed status information of received signal quality and decoded video and audio services.
2	Global Settings tab	Divided into General Settings, Downconverter Settings, IP Settings, Streaming Settings, OSD Settings and Genlock Settings panes.
3	Configuration tab	Divided into General, IFB, Demod 1, Decoder 1, Demod 2 and Decoder 2 panes. The Configuration tab contains the list of 16 presets. Each preset the user can specify demodulation parameters, decoding modes, and descrambling configuration.
4	Log tab	The PRORXD receiver has the facility for generating log files of receiver status information.
5	Uploads tab	Enables you to upload a license file to enable licensable features, and send software upgrade files to the PRORXD.

No	Property	Description
6	Frequency tab	The PRORXD is can examine frequencies and find operating channels for tuning quickly.
7	Information tab	Contains information with software versions and unit special data. This information is necessary during a support call for example.
8	Overview sub-tab	Some of the tabs have sub-tabs to divide the information more or they will use panes to divide information.
9	Information Fields	The sub-tabs or panes are divided into fields of information that you will operate with.

Table 7-1 – Control Pages Key

Next Steps

Configure the Basic Settings.

7.5 Configuring the Basic Settings

When shipped, the PRORXD is set to be given an IP address by an external DHCP server.

In managed networks which operate with DHCP address allocation this option must be selected. In networks that are manually managed (or do not have a DHCP server), users can prefer to give an IP address manually.

When you start-up the PRORXD for the first time it will be necessary to configure these items:

- It is necessary to turn off DHCP
- It is necessary to set a fixed IP address

Before you Start

This is necessary:

- A fully powered PRORXD.

Step 1: Switch DHCP to OFF

Read the topic: **Toggling DHCP On or Off** in *Basic Operation*.

Step 2: Set a Fixed IP Address

Read the topic: **Setting a Fixed IP Address** in *Basic Operation*.

7.6 Working with the Status Tab

The **Status Tab** displays detailed status information of received signal quality and decoded video and audio services.

The Status Tab is divided into four sub-tabs:

- Overview
- Input
- Spectra
- Service

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Overview Sub-Tab

1. Click on **Status** > **Overview** tab.

Screenshot: Overview Sub-Tab

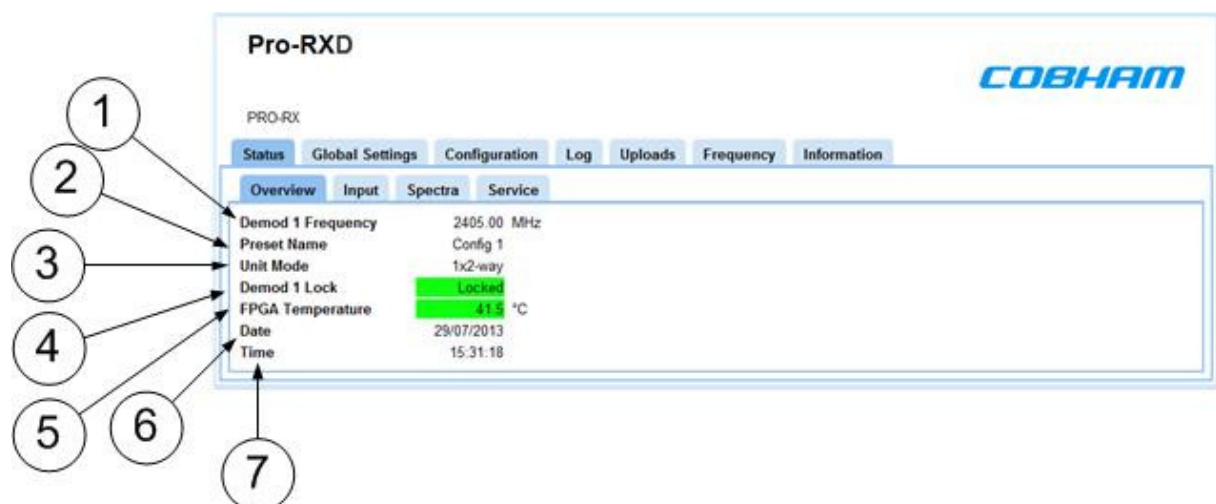


Figure 7-3 Status Tab showing Overview Sub-Tab

Step 2: Interpret the Overview Sub-Tab

No	Property	Range	Description
1	Demod 1 Frequency (MHz)	L, S and C Bands	The frequency in megahertz (MHz) to which the receiver's first demodulator is tuned.
2	Preset Name	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	This is the configuration you are currently working on. Only 1 to 16.
3	Unit Mode	1x2-way 1x4-way 2x4-way etc.	The configuration of the diversity and channel configuration of the receiver.
4	Demod 1 Lock	Locked (Green background) or Not Locked (red background).	Tells you if the first demodulator has successfully demodulated the incoming RF.
5	FPGA Temperature	A temperature on a green or red field background.	This field reports the current temperature of the FPGA in degrees Celsius. If the field background is green, the temperature is in limits. If the background shows red, then the FPGA is overheating and the unit must be switched off immediately. It must be in the region of 50 to 80 degrees Celsius.
6	Date	A correct date.	You can set this in Global Settings > Set Clock button.
7	Time	A correct time.	You can set this in Global Settings > Set Clock button.

Table 7-2 – Overview Sub-Tab Key

Step 3: Open the Input Sub-Tab

1. Click on, **Status > Input** tab.

Screenshot: Input Sub-Tab

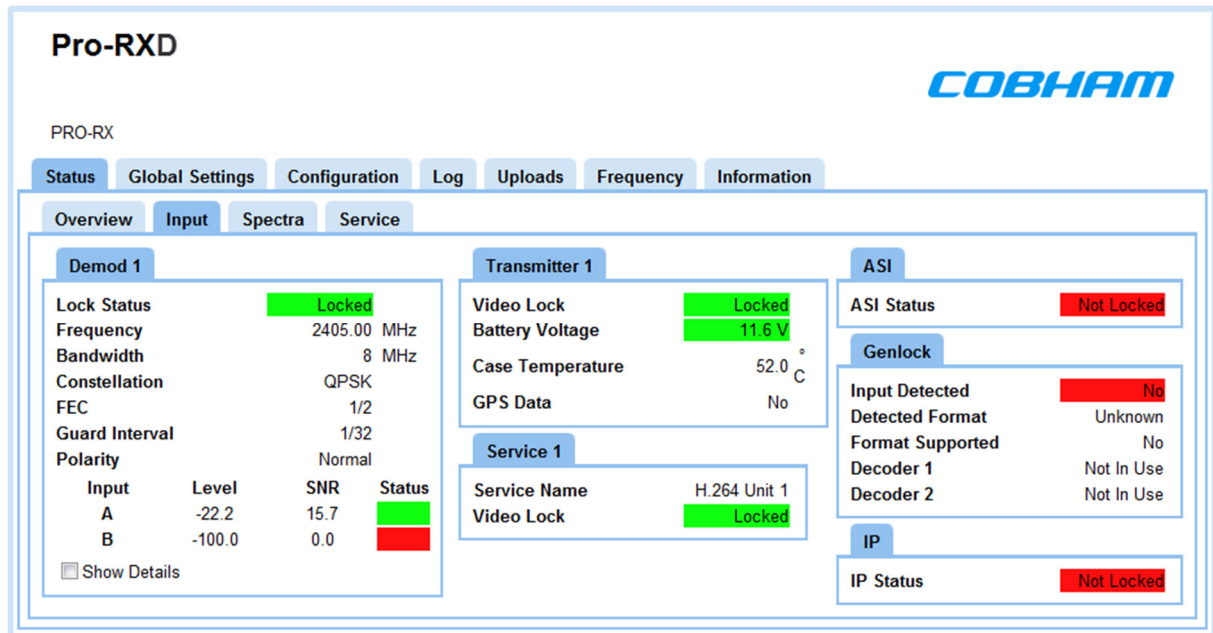


Figure 7-4 Status Tab showing Input Sub-Tab

Step 4: Interpret the Demod 1 Pane

Screenshot: Demod 1 Pane

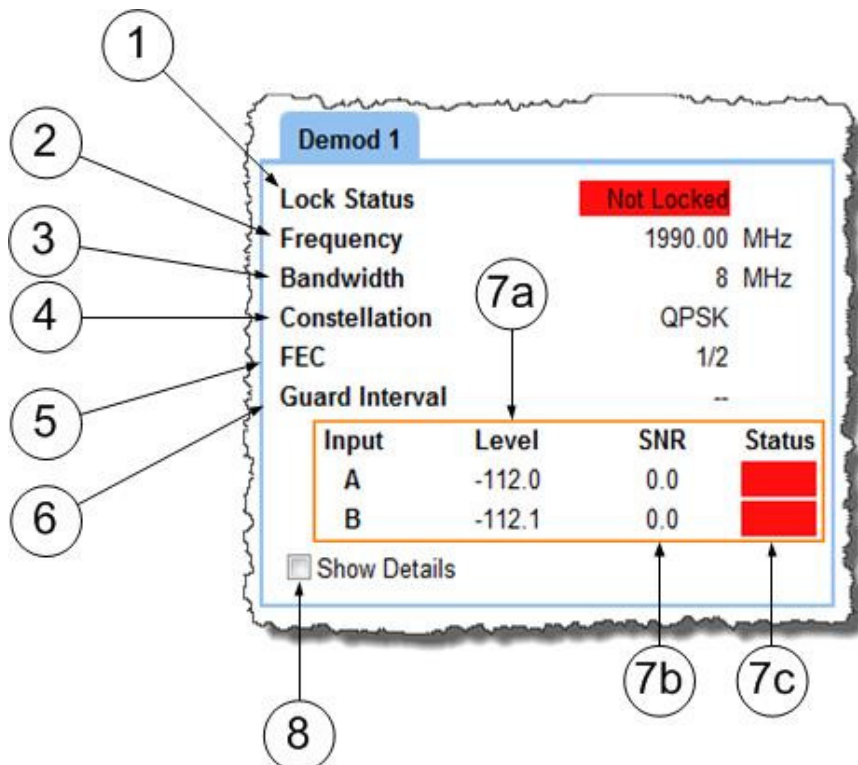


Figure 7-5 Input Sub-Tab showing Demod 1 Pane

No	Property	Range	Description
1	Lock Status	Locked (green background) or Not Locked (red background).	Tells you if the first demodulator has successfully locked to the incoming bit stream.
2	Frequency (MHz)	L, S and C Bands	The frequency in megahertz (MHz) to which the receiver's first demodulator is tuned.
3	Bandwidth	DVBT/UMVL: 6, 7 and 8MHz Narrowband: 2.5MHz 1.25MHz and 625kHz	DVB-T / UMVL bandwidths (usually used for broadcast). Cobham narrowband (usually for surveillance). Cobham Ultra-narrowband (this is a licensable feature, usually for surveillance).
4	Constellation	DVBT: QPSK, 16QAM, 64QAM Narrowband/UMVL: BPSK, 8PSK, QPSK, 16QAM	This field indicates the OFDM constellation being received. QPSK-less user data, more robust, more range. 16QAM-more user data, less robust, less range. The mode is automatically detected and is simply displayed here. You can't change it other than at the transmitter.
5	FEC	DVBT: 1/2, 2/3, 3/4, 5/6, 7/8 Narrowband/UMVL: 1/3 or 2/3	This field indicates the forward error correction (FEC) rate which is being applied. Think 'data bits/all bits' 1/3 means 1 bit out of 3 bits is data and thus 2 bits are used for error correction. Small quantity of user data means less picture quality, but more error correction means a more robust signal and thus more range. 2/3 means 2 bits out of 3 bits are data and thus 1 bit is used for error correction. More user data means better picture quality, but less error correction means less robust signal and thus less range. The mode is automatically detected and is simply displayed here. You can't change it other than at the transmitter.

No	Property	Range	Description
6	Guard interval	DVBT: 1/32, 1/16, 1/8, 1/4 Narrowband/UMVL: 1/16 or 1/8	The guard interval which is being applied to the narrowband mode in operation. The guard interval is a deliberate extension of the RF symbol period to give immunity to reflections. 1/16, short extension, deals with fast reflections, more data, less range. 1/8, long extension, deals with slower reflections, less data, more range.
7a	Input Level A		The level in dBm of the signal being received on antenna A There are readings for each of the antennas.
7b	Input A SNR	Could be any number.	The signal to noise ratio of the signal being received on antenna A. There are readings for each of antennas.
7c	Status	Green or Red	A visual indication of signal strength.
8	Show Detail Check Box	Select or Clear	When selected, more details about the error corrector on this page are displayed.

Table 7-3 – Demod 1 Pane Key

Step 5: Check the Show Details Checkbox

When selected, the extra details about the error corrector on this page are displayed.

Screenshot: Demod 1 Pane, Show Details Selected

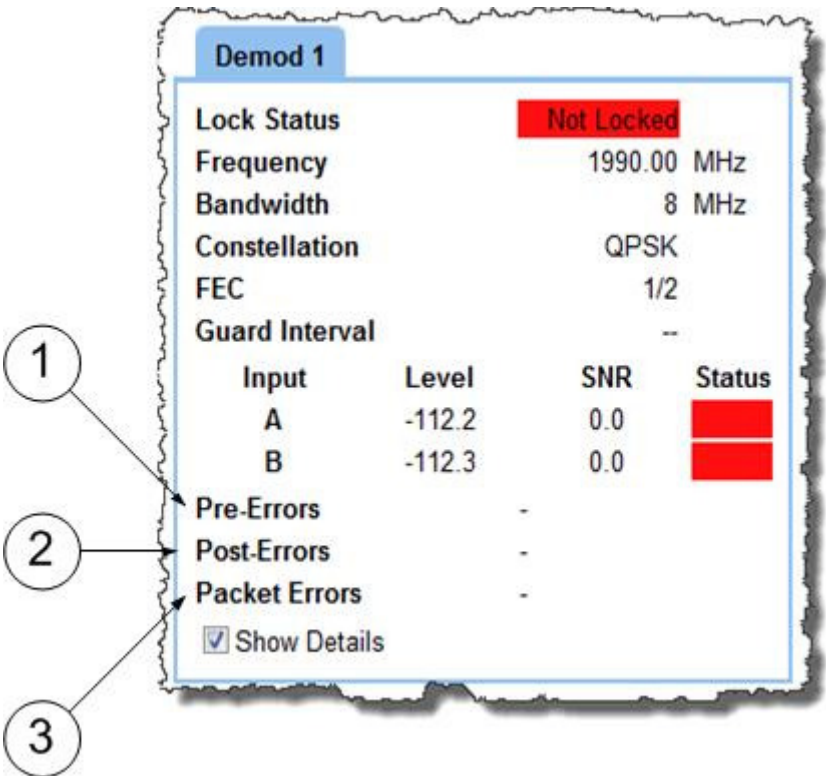


Figure 7-6 Demod 1 Pane with Show Details Selected

No	Property	Range	Description
1	Pre-Errors	0 is ideal. Must be a number.	The bit error rate for pre-errors.
2	Post-Errors	0 is ideal. Must be a number.	The bit error rate for post-errors.
3	Packet Errors	0 is ideal. Could be any number.	The number of packet errors coming out of the error correction system. An error here will corrupt the video, audio or data signals coming through the receiver.

Table 7-4 – Demod 1 Pane with Show Details Key

Step 6: Interpret the Transmitter 1 Pane

Some Cobham transmitters can send metadata with the RF signal. This metadata must be switched on at the transmitter and then gives useful information at the receiver.

Screenshot: Transmitter 1 Pane

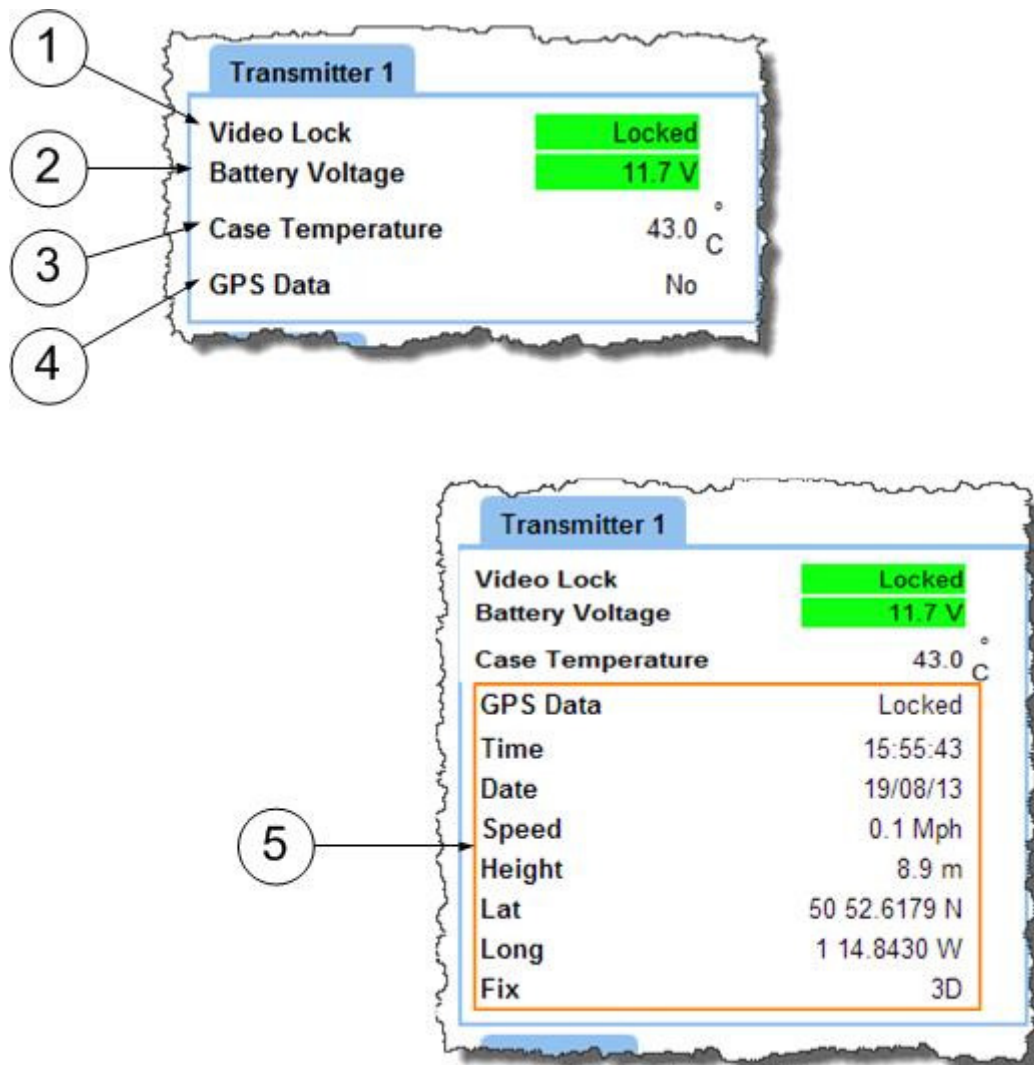


Figure 7-7 Input Sub-Tab showing Transmitter 1 Pane

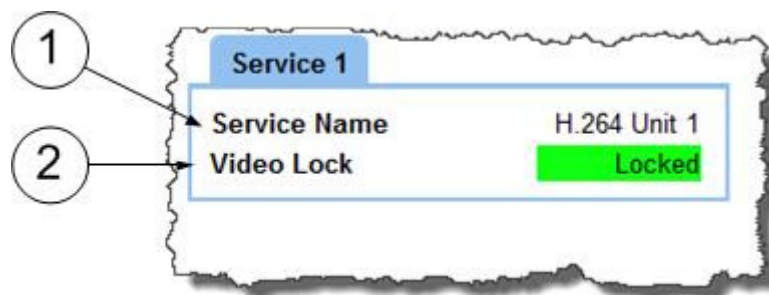
No	Property	Range	Description
1	Video Lock	Locked (green background) or Not Locked (red background).	Tells you if the transmitter has successfully locked to its incoming video signal.

No	Property	Range	Description
2	Battery Voltage	Any voltage on a green or red field background.	This field reports the current voltage of the transmitter's battery in VDC. If the field background is green, the voltage is more than the TX Battery Alarm voltage parameter specified in the Global Settings > General Settings pane. If the background shows red, then the voltage is below the alarm limit, too low and the unit will not operate correctly.
3	Case Temperature	Any temperature on a green or red field background.	This field reports the current temperature of the transmitter's enclosure in degrees Celsius.
4	GPS Data	Locked or No	Indicates if GPS Data is being sent from the transmitter. If GPS NMEA data is available, the receiver will find and show it.
5	GPS Data	Locked in this example.	This shows the Transmitter 1 Pane with GPS data being received.

Table 7-5 – Transmitter 1 Pane Key

Step 7: Interpret the Service 1 Pane

Screenshot: Service 1 Pane

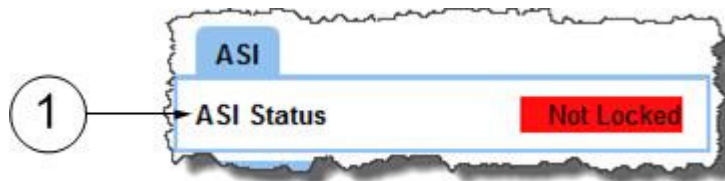
**Figure 7-8 Input Sub-Tab showing Service 1 Pane**

No	Property	Range	Description
1	Service Name	Could be anything.	This text box lets you name the multicast stream as delivered in the SAP/SDP packets from the unit. The Service Name on the receiver must align with the transmitter's service name.
2	Video Lock	Locked (green background) or Not Locked (red background).	Tells you if the unit has successfully locked to the incoming video signal.

Table 7-6 – Service 1 Pane Key

Step 8: Interpret the ASI Pane

Screenshot: ASI Pane

**Figure 7-9 Input Sub-Tab showing ASI Pane**

No	Property	Range	Description
1	ASI Status	Locked (green background) or Not Locked (red background).	Tells you if the unit has successfully locked to the incoming ASI signal.

Table 7-7 – ASI Pane Key

Step 9: Interpret the Genlock Pane

Screenshot: Genlock Pane

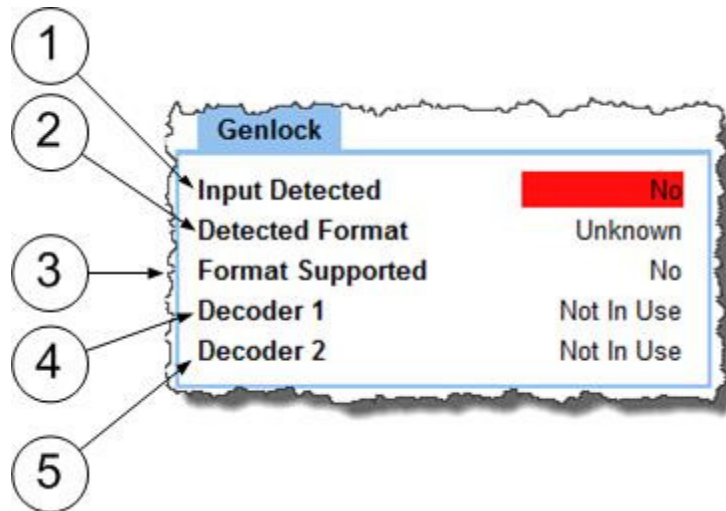


Figure 7-10 Input Sub-Tab showing Genlock Pane

No	Property	Range	Description
1	Input Detected	Yes (stable green background) or No (stable red background).	Tells you if the unit has successfully discovered an incoming Genlock signal.
2	Detected Format	Unknown PALNTSC HD standards	Tells you the format of the Genlock signal. If the unit features the tri-level sync upgrade, HD standards are also detected.
3	Format Supported	Yes or No.	Tells you if the currently received Genlock format is correct for operation with this receiver.
4	Decoder 1	Using Not in Use	Using - External Genlock has been selected and is supported. Not in use – External Genlock not selected or not supported.
5	Decoder 2	Using Not in Use	Using - External Genlock has been selected and is supported. Not in use – External Genlock is not selected or not supported.

Table 7-8 – Genlock Pane Key

Step 10: Interpret the IP Pane

Screenshot: IP Pane

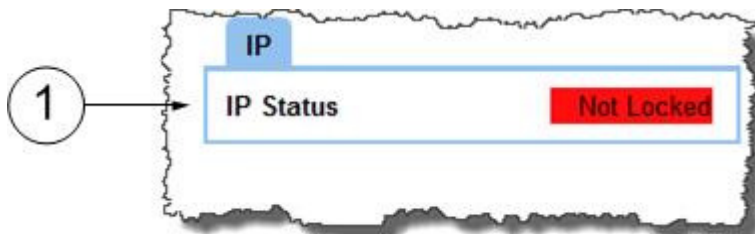


Figure 7-11 Input Sub-Tab showing IP Pane

No	Property	Range	Description
1	IP Status	Locked (green background) or Not Locked (red background).	Tells you if the unit has successfully locked an IP signal. Not Locked – IP Input not selected or is not being received.

Table 7-9 – IP Pane Key

Step 11: Open the Spectra Sub-Tab

1. Click on, **Status** > **Spectra** tab.

Screenshot: Spectra Sub-Tab

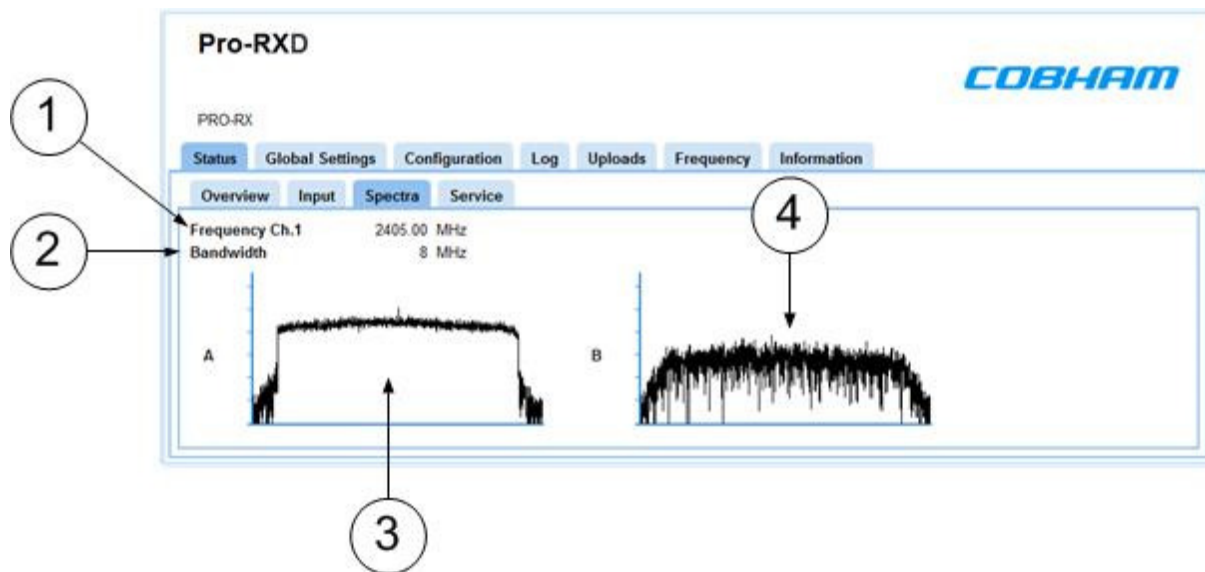


Figure 7-12 Status Tab showing Spectra Sub-Tab

No	Property	Range	Description
1	Frequency (MHz).	L, S and C Bands	The frequency in megahertz (MHz) to which the receiver's channel 1 is currently tuned.
2	Bandwidth.	DVBT/UMVL: 6, 7 and 8MHz Narrowband: 2.5MHz 1.25MHz and 625kHz	The bandwidth which is currently in operation. DVB-T bandwidths (usually used for broadcast). Cobham narrowband (usually for surveillance). Cobham Ultra-narrowband (this is a licensable item, usually for surveillance).
3	Spectrum Display for Antenna A.	Displays for the A and B antennas are shown in my example, but there may be up to eight displays here, A to H.	When tuned in correctly it is possible to see the classic 'top hat' COFDM waveform as in this example.
4	Spectrum for Antenna B.		Antenna B has been disconnected here to show you what a noisy channel looks like. Compare this to the COFDM waveform in channel A.

Table 7-10 – Spectra Sub-tab Key

Step 12: Open the Service Sub-Tab

1. Click on, **Status > Service** tab.

Screenshot: Service Sub-Tab

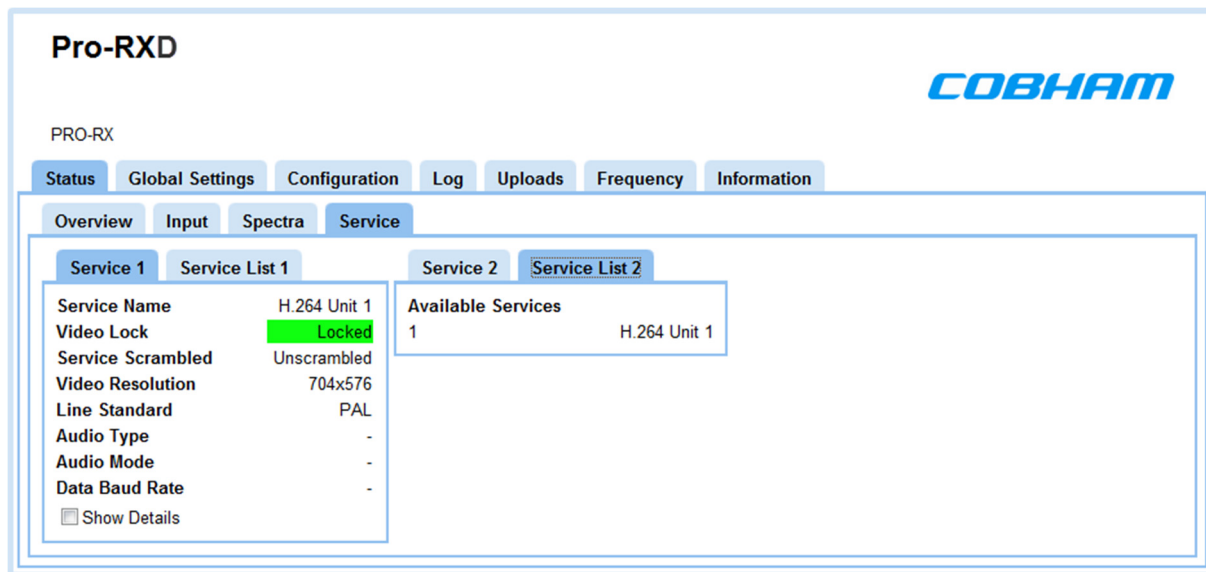


Figure 7-13 Status Tab showing Service Sub-Tab

Step 13: Interpret the Service 1 Pane

Screenshot: Service 1 Pane

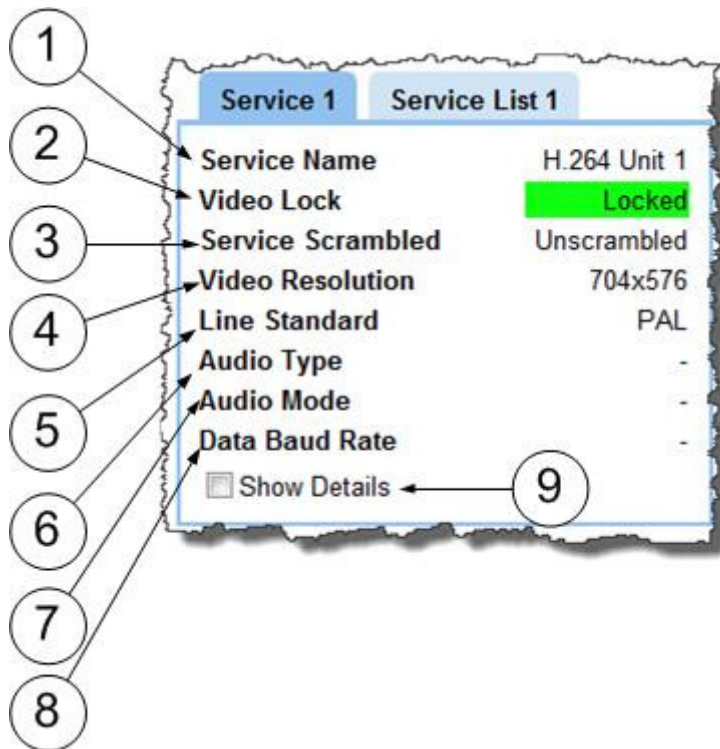


Figure 7-14 Service Sub-Tab showing Service 1 Pane

No	Property	Range	Description
1	Service Name	Could be anything.	Displays the currently received and decoded service name from the incoming service.
2	Video Lock	Locked (green background) or Not Locked (red background.	Tells you if the unit is successfully decoding the incoming video signal.
3	Service Scrambled	Scrambled or Unscrambled	Tells you the encryption status of the incoming signal.
4	Video Resolution	704x576 or an applicable resolution.	Tells you the resolution of the video that was set at the transmitter.
5	Line Standard	SD: PAL or NTSC HD: 720p50, 720p59, 720p60, 1080i50, 1080i59, 1080i60, 1080p23, 1080p24, 1080p25, 1080p29, 1080p30, 1080psf23, 1080psf24, 1080psf25, 1080psf29, 1080psf30	Tells you the line standard of the video that was set at the transmitter.
6	Audio Type	MPEG Layer 1, MPEG Layer 2 or Solo Nicam	Tells you the type of the audio that was set at the transmitter.
7	Audio Mode	Stereo or Mono	Tells you the mode of the audio that was set at the transmitter.
8	Data Baud Rate	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	Tells you the baud rate of the date that was set at the transmitter.
9	Show Details Checkbox	Select or Clear.	When selected, you will see more information in the Service 1 Pane. You can keep this cleared to have less clutter on the screen.

Table 7-11 – Service 1 Sub-tab Key

Step 14: Check the Show Details Checkbox

When selected, more details about the Service 1 Pane on this page are displayed.

Screenshot: Service 1 Pane, Show Details Selected

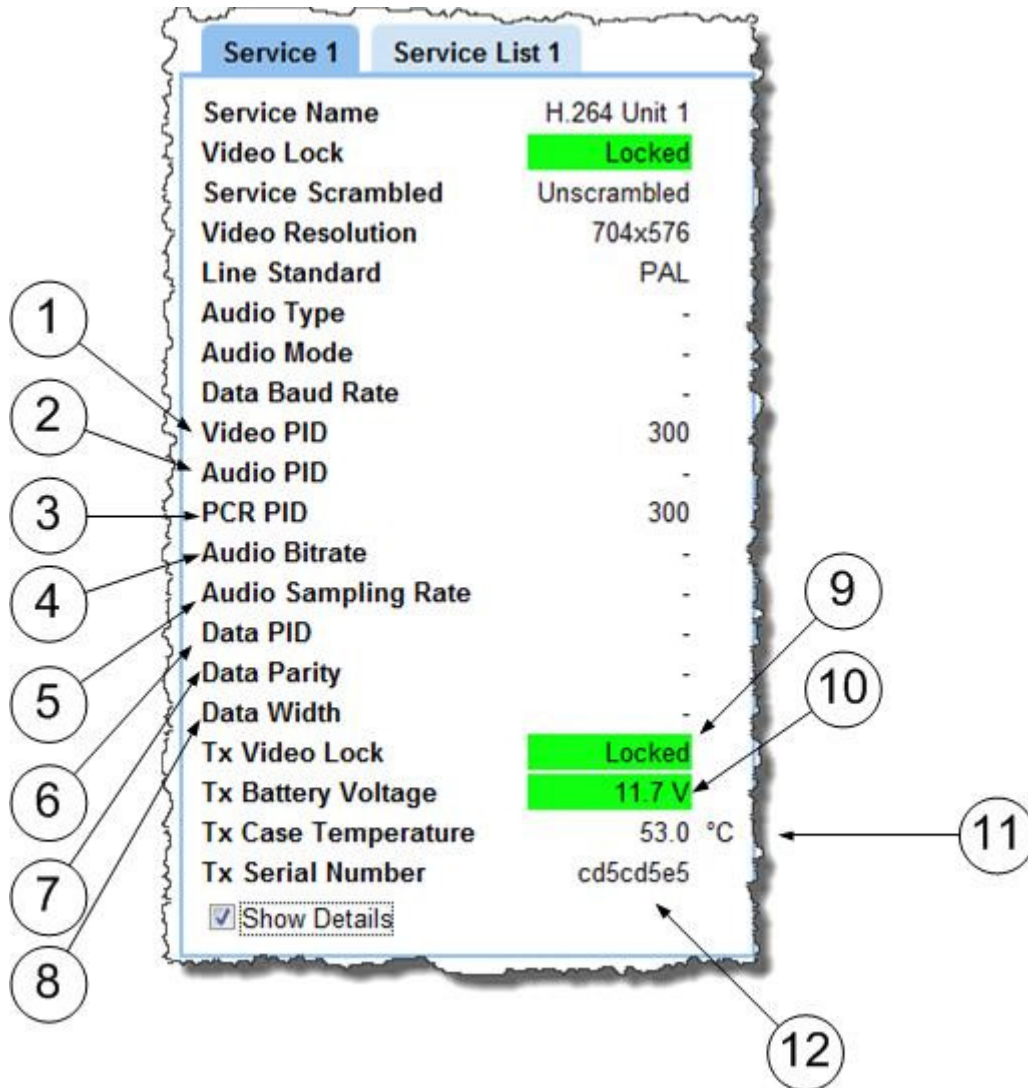


Figure 7-15 Service 1 Pane with Show Details Selected

No	Property	Range	Description
1	Video PID	Default or 0x0020 to 0x1FFE	Each table or elementary stream in a transport stream is identified by a 13-bit packet ID (PID). This is set at the transmitter.

No	Property	Range	Description
2	Audio PID	Default or 0x0020 to 0x1FFE	Each table or elementary stream in a transport stream is identified by a 13-bit packet ID (PID). This is set at the transmitter.
3	PCR PID PCR=Program Clock Reference	Default or 0x0020 to 0x1FFE	Each table or elementary stream in a transport stream is identified by a 13-bit packet ID (PID). This is set at the transmitter. Used to sync the audio and video. The PCR keeps the system clock synced. If the clock starts to drift, it is corrected with the PCR value.
4	Audio Bitrate	64, 96, 128, 160, 192, 224, 256, 288, 320, 352, 384, 416 and 448kb/s are examples of MPEG L1 bit-rates.	Reports the audio bitrate that has been set at the transmitter. This is the MPEG audio encoding bit-rate. Usually the higher the number the better the quality.
5	Audio Sampling Rate	44.1kHz, 48kHz or 32kHz	Reports the audio sampling rate that has been set at the transmitter.
6	Data PID	Default or 0x0020 to 0x1FFE	Each table or elementary stream in a transport stream is identified by a 13-bit packet ID (PID). This is set at the transmitter.
7	Data Parity	None, Even, Odd	This is the parity of serial data passing through the unit. Usually, this must align with the data device you are planning to operate. Reports the Data parity that has been set at the transmitter.
8	Data Width	7 or 8 bit	8 bit is the Cobham standard and 7 bit is available for interoperability with third party equipment. Tells you the Data Width that has been set at the transmitter.

No	Property	Range	Description
9	TX Video Lock	Locked (stable green background) or Not Locked (stable red background).	Tells you if the transmitter has successfully locked to an incoming video signal. This does not mean this receiver necessarily has video lock.
10	Battery Voltage	A voltage on a green or red field background.	This field reports the current voltage of the transmitter's battery in VDC. If the field background is green, the voltage is in limits. If the background shows red, then the voltage is too low and the unit will not operate correctly. The voltage alarm threshold is set in Global Settings>General Settings>Tx Battery Alarm(v)
11	TX Case Temperature	A temperature reading.	This field reports the current temperature of the transmitter enclosure in degrees Celsius.
12	TX Serial Number	A correct electronic serial number (ESN).	The ESN is used for licencing and it can be necessary for you to tell us this number during a support call for example.

Table 7-12 – Service 1 Pane with Show Details Key

Step 15: Configure the Service List 1 Pane

Screenshot: Service List 1 Pane

**Figure 7-16 Service Sub-Tab showing Service List 1 Pane**

No	Property	Range	Description
1	Available Services	A correct Service	Provides a list of services which have been recovered from the transport stream and are available for you to see.

Table 7-13 – Service List 1 Pane Key

Note: Service 2 and Service List 2 operate with the same procedure as Service 1 and Service List 1.

7.7 Working with the Global Settings Tab

The Global Settings tab contains parameters that control global unit features common to all presets, including downconverter settings, IP settings, streamer settings and OSD configuration for example.

The Global Settings tab is divided into six panes:

- General Settings
- Downconverter Settings
- IP Settings
- Streaming Settings
- OSD Settings
- Genlock Settings

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Global Settings Tab

1. Click on the **Global Settings** tab.

Screenshot: Global Settings Tab

Pro-RXD

PRO-RX

Status Global Settings Configuration Log Uploads Frequency Information

General Settings

Audio Output

HD Downconversion

Tx Battery Alarm (V)

Downconverter Settings

Presets

LO Frequency

LO Side

LNB Power

LNB Voltage

Presets 2

LO Frequency 2

LO Side 2

LNB Gain Offset

Individual LOs ☐

IP Settings

DHCP Enable ☐

IP Address

Network Mask

Gateway

Streaming Settings

Streaming Enable ☐

Streaming Mode

Streamer Select

Multicast Address

Multicast TTL

Multicast Port

Multicast Service Name

Multicast ToS

Streaming Enable 2 ☐

Streamer Select 2

Multicast Address 2

Multicast Port 2

Multicast Service Name 2

Multicast ToS 2

OSD Settings

Video 1 Video 2

OSD Mode

Eng. Mode

Spectra Demod 1

Spectra Demod 2

Blue On Fail ☒ ☒

Logo Display ☐ ☐

Show on SDI ☐ ☐

Show on Analogue ☐ ☐

Genlock Settings

Decoder 1 Decoder 2

Genlock Mode

Offset Lines

Offset Pixels

Apply Refresh Set Clock

Figure 7-17 Global Settings Tab

Step 2: Configure the General Settings Pane

Screenshot: General Settings Pane

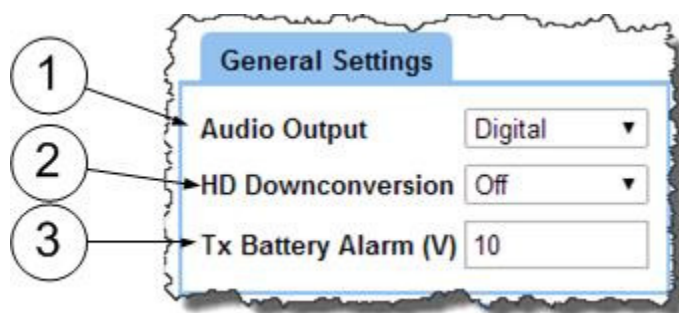


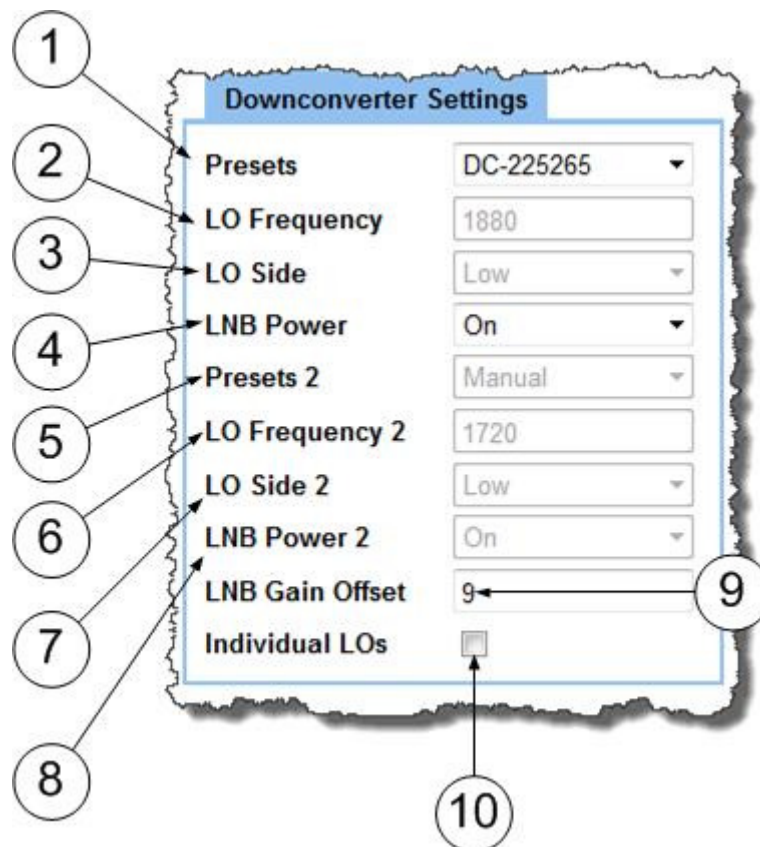
Figure 7-18 General Settings Pane

No	Property	Range	Description
1	Audio Output	Analogue or Digital	Select the audio mode to suit your operation.
2	HD Down Conversion	Off, 4:3 or 16:9	When licensed for HD down conversion, lets you have the possibility to select the video output aspect ratio.
3	TX Battery Alarm (V)	A value from 0 to 20V.	This number is the voltage where the TX Battery Voltage caption turns red.

Table 7-14 – General Settings Pane Key

Step 2: Configure the Downconverter Settings Pane

Screenshot: Downconverter Settings Pane

**Figure 7-19 Downconverter Settings Pane**

No	Property	Range	Description
1+6	Presets	<div> Manual UHF DCB-100150 DCB-150200 DCB-200250 DCB-250300 DCB-300350 DCB-340370 DCB-450500 DCB-550600 DCB-810860 DCBGS-100150 DCBGS-167203 DCBGS-203255 DCBGS-310360 DCBGS-440500 DCBGS-550600 DCBGS-640700 DCBGS-700750 DCBGS-198270 DC-100140 DC-225265 </div>	<p>If you select Manual it means it will be necessary to type in the LO Frequency and LO Side in the next two fields manually. You might do this for an unusual frequency that requires an odd downconverter.</p> <p>If you select UHF it means it is not really necessary to have a downconverter because the receiver is UHF anyway. There can be an amplifier up near the antenna.</p> <p>The easiest thing to do is select your downconverter from the list. Then the LO Frequency and LO Side will be filled in for you. Look at the label on your downconverter to see which model you have.</p>
2+7	LO Frequency (MHz)	1880 or a correct downconverter frequency.	<p>Most of our receiver units operate downconverters to lower the frequency from microwave (L, S and C-Band) to an Intermediate Frequency (IF) between 51 and 858MHz that the on-board tuners in the receivers can operate with.</p> <p>We find this information from the downconverter frequency and side table in <i>Appendix D – Downconverter Data</i>.</p>
3+8	LO Side	Low or High	<p>It is necessary to set which side (of the expected incoming frequency) the LO frequency will be.</p> <p>In my example the incoming frequency I wish to receive is in S-Band, 2.25GHz to 2.65 GHz. I've selected a DC-225265 downconverter with a LO Frequency of 1880MHz. We see that 1880MHz is <i>lower</i> than 2.25GHz, thus I set the LO side to be Low.</p> <p>We find this information from the downconverter frequency and side table in <i>Appendix D – Downconverter Data</i>.</p>

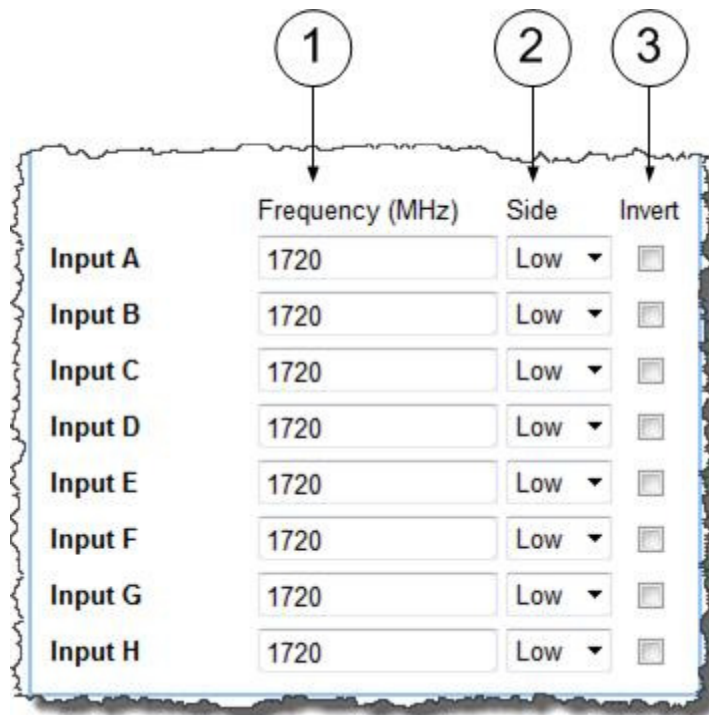
No	Property	Range	Description
4+9	LNB Power	On or Off	<p>It is necessary for the downconverters up on the mast to have power. We send this along the IF line. We name this LNB power and this is where you switch it on.</p> <p>LNB=Low Noise Block.</p> <p>You can wish to switch LNB power off if you are operating a third party downconverter that has its own power supply for example.</p>
5+10	LNB Voltage	9V or 12V	<p>When the unit is fitted with latest tuner PCBs, the LNB voltage is selectable.</p>
11	LNB Gain Offset	9 typically, but an applicable value to suit the downconverter you are operating.	<p>Most downconverters introduce gain to the RF path. A DCB-200250 for example introduces 9dB in its standard gain version and 19dB in the high gain version.</p> <p>To make sense of the signal strength numbers it is necessary to apply this correction.</p>
12	Individual LOs	Select or Clear	<p>When cleared the LO Frequency and LO Side apply globally to all downconverters attached to the receiver.</p> <p>When selected, new fields open up to let you set individual LO Frequencies and LO Sides for each downconverter. This means you could have one half of the antennas set up for S-Band and the others, L-Band.</p>

Table 7-15 – Downconverter Settings Pane Key

Step 3: Select the Individual LOs Checkbox

When selected, more fields which let you see individual LO Frequencies are shown. You will also find a checkbox which enables you to invert the COFDM spectrum.

Screenshot: Downconverter Settings Pane, Individual LOs Selected

**Figure 7-20 Downconverter Settings Pane with Individual LOs Selected**

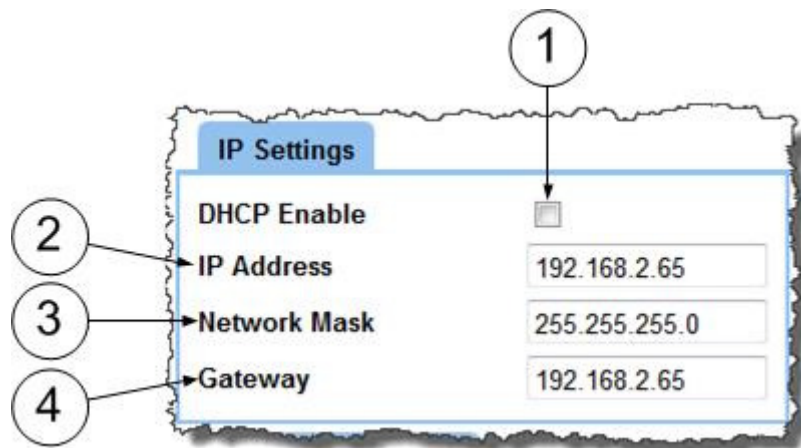
No	Property	Range	Description
1	LO Frequency (MHz)	1720 or a correct downconverter frequency.	<p>All our receiver units operate downconverters to lower the frequency from microwave (L, S and C-Band) to an Intermediate Frequency (IF) between 51 and 858MHz that the on-board tuners in the receivers can operate with.</p> <p>We find this information from the downconverter frequency and side table in <i>Appendix D – Downconverter Data</i>.</p>
2	LO Side	Low or High	<p>It is necessary to set which side (of the expected incoming frequency) the LO frequency will be.</p> <p>We find this information from the downconverter frequency and side table in <i>Appendix D – Downconverter Data</i>.</p>

No	Property	Range	Description
3	Invert	Select or Clear	Selected=Inverted Cleared=Normal All Cobham equipment must operate with normal mode. The receivers can be used with other manufacturer's products and sometimes this requires us to change the polarity to inverted to align with this third party equipment.

Table 7-16 – Individual LO Settings Key

Step 4: Configure the IP Settings Pane

Screenshot: IP Settings Pane

**Figure 7-21 IP Settings Pane**

No	Property	Range	Description
1	DHCP Enable (Dynamic host configuration protocol)	Select or Clear	When selected the PRORXD is given an IP address by an external DHCP server. In managed networks which use DHCP address allocation this must be selected. In networks that are manually managed (or do not have a DHCP server), users can give an IP address manually.

No	Property	Range	Description
2	IP Address	Example: 192.168.2.65	<p>If the PRORXD is not automatically acquiring its IP address through a DHCP server then a fixed IP address needs to be assigned to the unit</p> <p>Type an IP address for this PRORXD in the IP address text box. You can select a class of network of your choosing.</p>
3	Network Mask	Example: 255.255.255.0	<p>The network mask allows a network administrator to divide a network into smaller more useful subnets to stop too many numbers of IP packets being routed through the network. This is usually defined by the network administrator.</p> <p>Type a subnet mask in the Network mask text box.</p>
4	Gateway	Example: 192.168.2.254	<p>A default gateway is used by a host when an IP packet's destination address belongs to someplace external to the local subnet. The default gateway address is usually an interface belonging to the LAN's border router.</p> <p>We recommend you keep the gateway at the same value as the IP Address.</p> <hr/> <p>Note: For correct streaming operation, a correct Gateway address in the IP subnet range must be set manually or through DHCP.</p> <hr/>

Table 7-17 – IP Settings Pane Key

Step 5: Configure the Streaming Settings Pane

Screenshot: Streaming Settings Pane

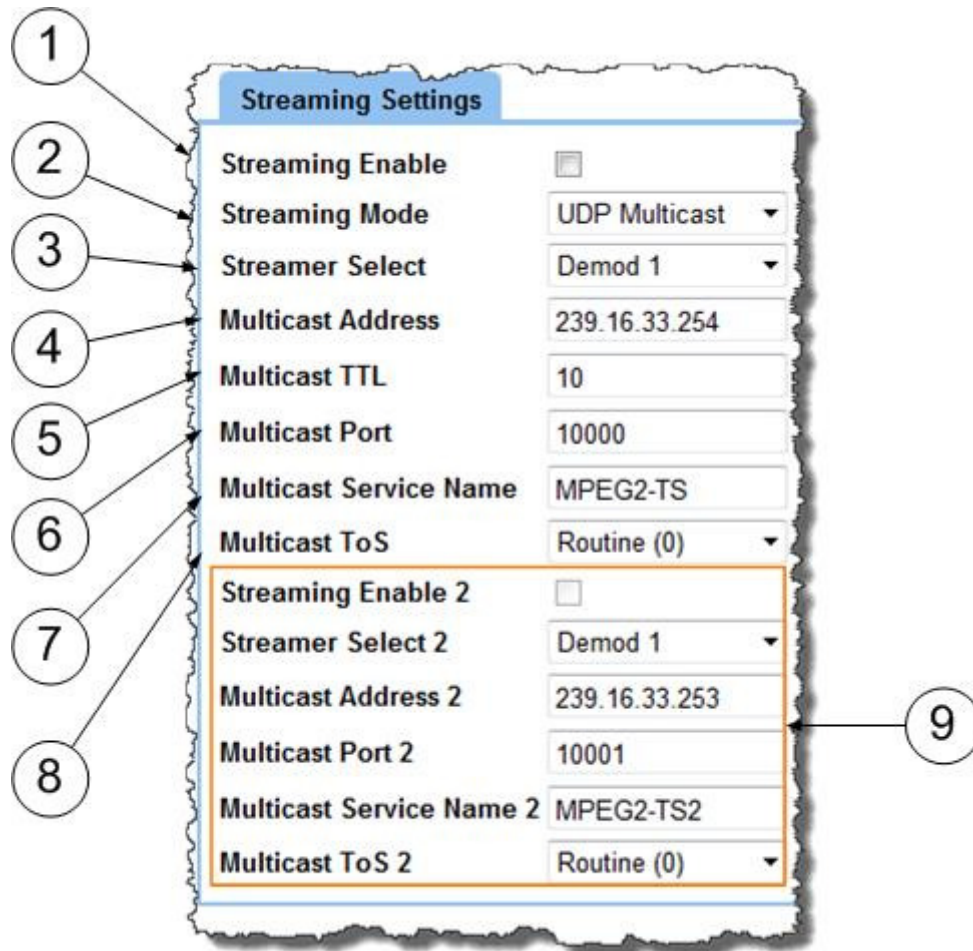
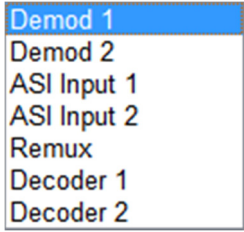
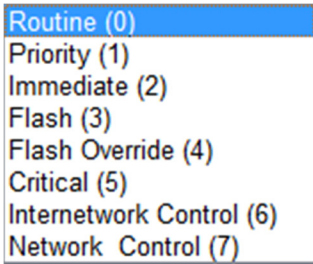


Figure 7-22 Streaming Settings Pane

No	Property	Range	Description
1	Streaming Enable	Select or Clear	Switches the streaming item on or off. Note: The PRORXD must be licensed for Streaming. If it is not, it is not possible to switch Streaming on. Also, for correct streaming operation, a correct Gateway address in the IP subnet range must be set manually or through DHCP.
2	Stream Mode	UDP Multicast or RTSP Multicast or RTSP Unicast	Select the streaming mode you wish to operate with.

No	Property	Range	Description
3	Streamer Select		<p>You select the source that will give the stream from this drop-down box.</p> <p>Demod 1 for example means the stream will come from the first receiver channel.</p>
4	Multicast Address	239.0.0.10	<p>This text box enables you to change the multicast address used by the unit.</p> <p>It is also possible to Unicast by specifying an applicable destination IP address in the local subnet range.</p>
5	Multicast TTL	1 to 255	This is the multicast time to live value.
6	Multicast Port	<p>10000</p> <p>Range available is 1-65535</p>	<p>Protocols like TCP or UDP use port numbers in the header to point traffic around the network. Low port numbers are used by computer systems for predefined tasks. For example SMTP (for your email service) uses port 25.</p> <p>A good rule is to use numbers above 10,000 to stop confliction with existing services.</p> <p>When you set up a port number on many computers on a network they will all listen for packets directed to that port.</p> <p>The default values are 10000 and 10001.</p>
7	Multicast Service Name	Up to 20 ASCII characters.	<p>The defaults are MPEG2-TS and MPEG2-TS2.</p> <p>This is an identifier for the service.</p>
8	Multicast ToS		The importance of the Multicast can be set here.

No	Property	Range	Description
9	Channel 2	See above.	All the controls are the same for the second channel.

Table 7-18 – Streaming Settings Pane Key

Step 6: Configure the OSD Settings Pane

Screenshot: OSD Settings Pane

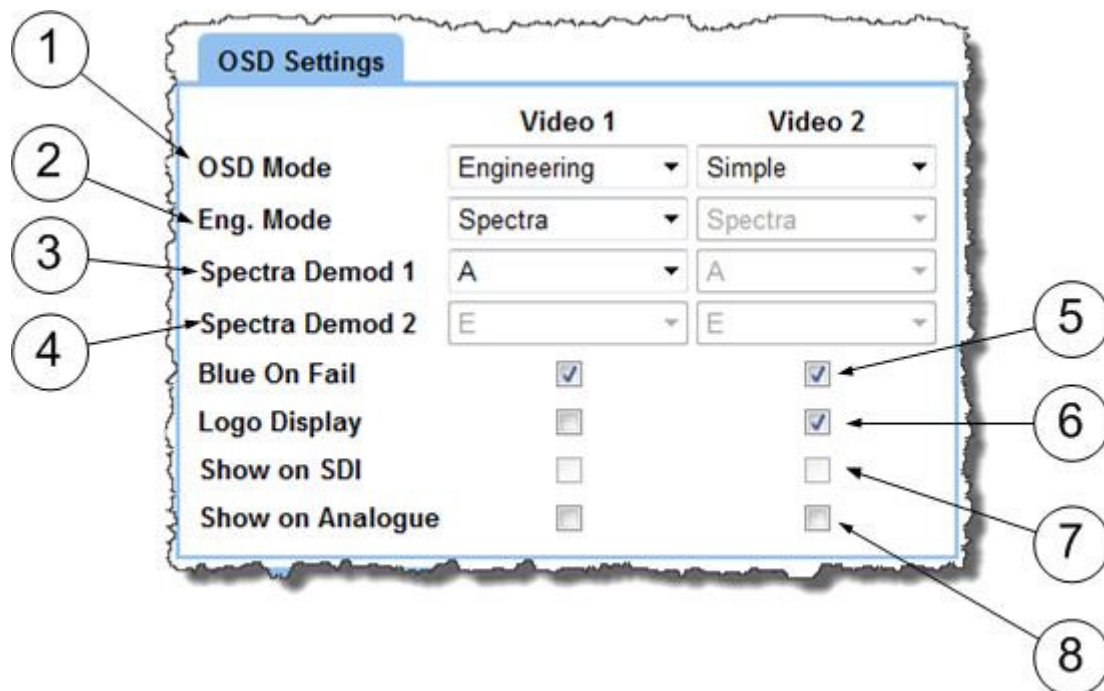


Figure 7-23 OSD Settings Pane

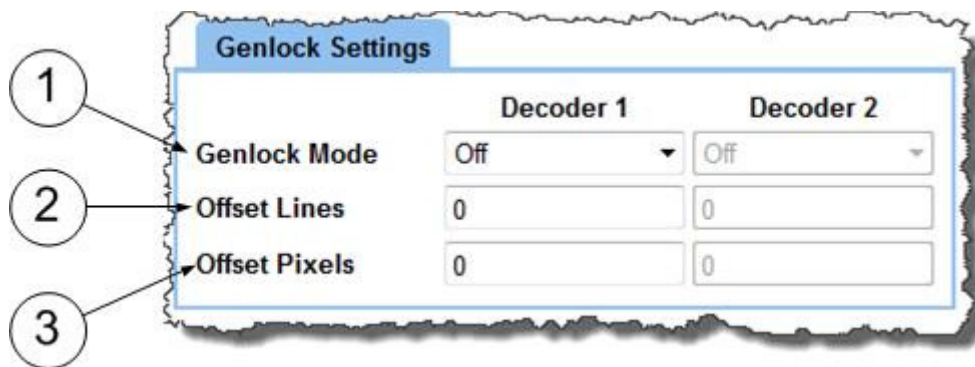
No	Property	Range	Description
1	Mode	Off Simple Compact Detailed Engineering	You can select how much information is displayed on the On Screen Display (OSD). You can also switch the OSD off.
2	Eng. Mode	Spectra Scan GPS/Tx Data	If you selected Engineering in Mode earlier, these fields become in operation. Spectra – Shows a graphic on the OSD of the spectra being received for the antenna selected. Scan – Shows the frequency scanner on the OSD almost the same as the display in the frequency tab. GPS/Tx Data – Shows metadata and GPS data from the transmitter on the OSD. The TX must be configured to send metadata and data must be the correct NMEA format.
3	Spectra Demod 1	A to H	The Demodulator 1 OSD Spectrum display can be set to show antenna A to H.
4	Spectra Demod 2	A to H	The Demodulator 2 OSD Spectrum display can be set to show antenna A to H.
5	Blue On Fail	Select or Clear	When selected, if the link is broken, a blue screen appears to tell you. Some broadcasters prefer not to have blue on fail set.
6	Logo Display	Select or Clear	When selected, the Cobham Logo will be displayed in the OSD.
7	Show on SDI	Select or Clear	When selected the OSD is displayed on the SDI output. You might wish to turn this off if you are transmitting from this port. The OSD is only available if an SD video service is decoded. If the video is HD, the OSD can only be displayed on SDI Output 2 and HD Down conversion is enabled and selected.

No	Property	Range	Description
8	Show on Analogue	Select or Clear	When selected the OSD is displayed on the Analogue output. You might wish to turn this off if you are transmitting from this port.

Table 7-19 – OSD Settings Pane Key

Step 7: Configure the Genlock Settings Pane

Screenshot: Genlock Settings Pane

**Figure 7-24 Genlock Settings Pane**

No	Property	Range	Description
1	Genlock Mode	Off External Internal	Off - Genlock switched off and system is not locked. External – Operating with the Genlock source connected to the external port on the rear of the receiver. This is usually your station SPG. Internal – Operating with the receiver's own Genlock source built into the unit.
2	Offset Lines	0	Standard dependant. Enables you to apply delay adjustment.
3	Offset Pixels	0	Standard dependant. Enables you to apply delay adjustment.

Table 7-20 – Genlock Settings Pane Key

Step 8: Operate the Apply Button Consistently

When you change a parameter on the Control Application it is very important to click the Apply button and wait for a moment for the changes to be sent to the device.

Frequently personnel change a parameter and then wonder why the device has not changed behaviour. Always click the **Apply** button.

Step 9: About the Refresh Button

If the Polling is enabled then the Control Application will poll the device at intervals of two seconds thus it can update the Transmitter Control Window with the latest configuration changes.

Sometimes, it might be necessary to keep the polling off. To update the Window in this situation it will be necessary to click the Refresh Button to see the latest changes.

7.8 Setting the Clock

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Global Settings Tab

2. Click on the **Global Settings** tab.

Step 2: Set the Clock

1. Click the **Set Clock** button.
2. The **Set Clock** dialog opens.
3. Click the **Date** box.
4. The **Calendar** opens.
5. Select the date as required.
6. In the **Time** box, enter the current time.
7. Make you use the correct time format! (hh:mm:ss).
8. In the **Time Zone** drop-down box, select the time zone you are in.
9. In the Daylight Saving drop-down box, select the setting as required. (Off, 1 hour or 2 hours).
10. Click the **Set** button.
11. The **Clock Set Successfully** message opens.
12. Click the **OK** button.

Screenshot: Set the Clock

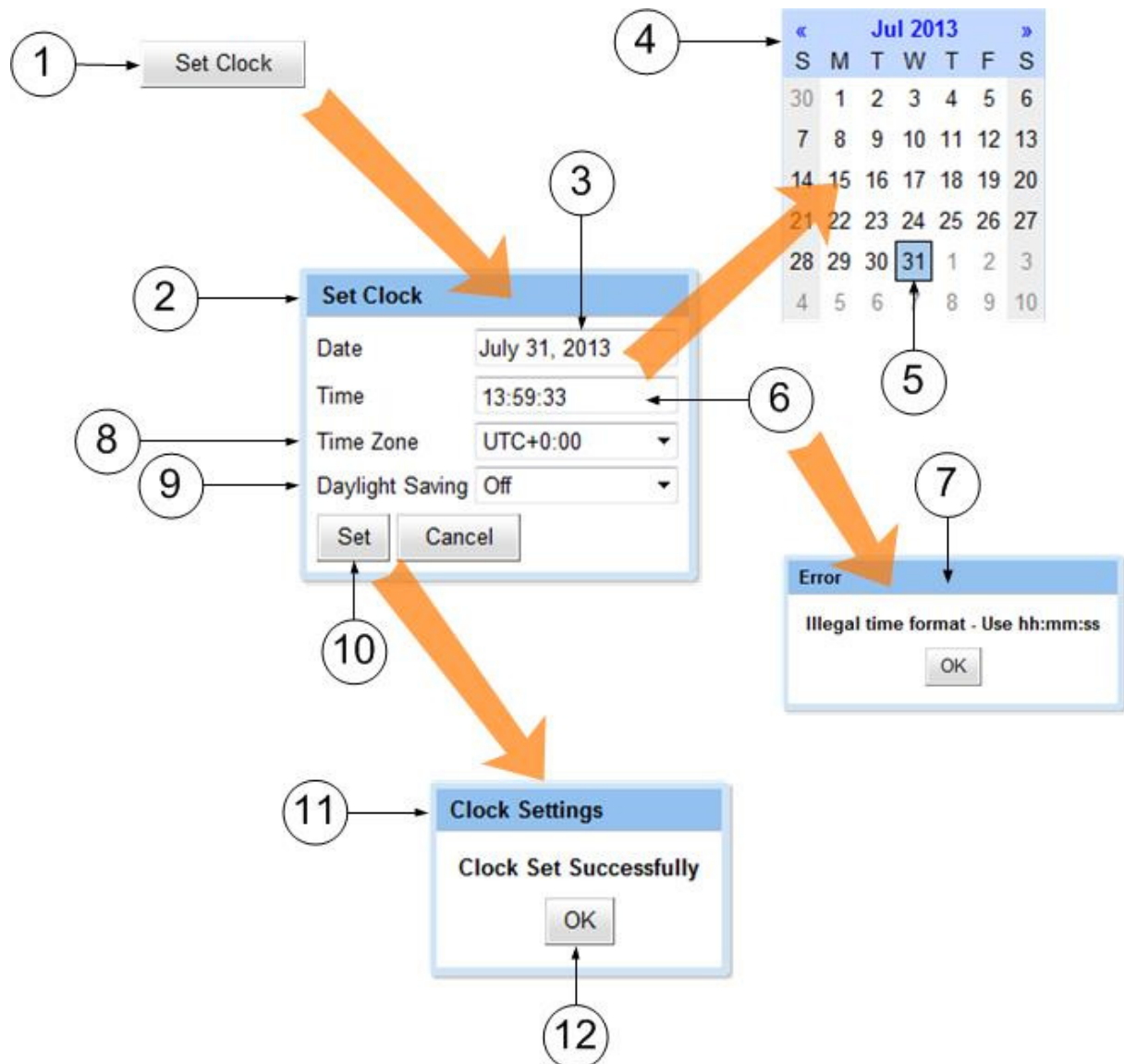


Figure 7-25 Set the Clock

7.9 Working with the Configuration Tab

The Configuration tab contains the list of 16 presets. Each preset enables you to specify demodulation parameters, decoding modes, and descrambling configuration.

You can easily install a different preset by selecting one of the 16 configuration tabs and clicking the **Apply** button.

The **Live** preset is indicated by a **green box** around the preset number.

Changes to the live preset are automatically applied with the **Apply** button. Changes made to all other non-live presets can be saved by clicking on **Save**.

The Configuration tab is divided into six panes:

- General
- IFB
- Demod 1
- Decoder 1
- Demod 2
- Decoder 2

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Configuration Tab

1. Click on the **Configuration** tab.

Screenshot: Configuration Tab

Pro-RXD **COBHAM**

PRO-RX

Status Global Settings **Configuration** Log Uploads Frequency Information

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

General
Preset Name: Config 1
Diversity Mode: 1x2-way
Modulation Type: DVBT
DVBT Carrier Mode: 2K
ASI Output: Demod 1
Remux Input: Off
Remux Bitrate: 5.00

IFB
IFB Enable: ☐
Tx IP Address: 192.168.0.9
Tx IP Port: 20000

Demod 1
Frequency (MHz): 1990.00
Bandwidth: 8MHz
Guard Interval: Auto
Polarity: Auto

Demod 2
Frequency (MHz): 2173.00
Bandwidth: 8MHz
Guard Interval: Auto
Polarity: Auto

Decoder 1
Decoder 1 Input: Demod 1
BNC Output: HD-SDI
Default Service: Unit 1
Default Program ID: 1
Service Select Mode: Defaults
Service List: No Service
IP Decoder Mode: UDP Multicast
Multicast Address: 234.0.0.10
Multicast Port: 10001
Buffer Delay (ms): 50
Descrambling Mode: Off
Descrambling Keys: Change Keys

Decoder 2
Decoder 2 Input: Demod 1
BNC Output: HD-SDI
Default Service: Unit 1
Default Program ID: 1
Service Select Mode: Defaults
Service List: No Services
IP Decoder Mode: UDP Unicast
Multicast Address: 239.16.33.254
Multicast Port: 10000
Buffer Delay (ms): 50
Descrambling Mode: Off
Descrambling Keys: Change Keys

Save Apply Copy From Config

Figure 7-26 Configuration Tab

Step 2: Understand the Preset Tab Colours

1. The **green box** shows which preset is currently **in operation** in the receiver.
2. The **light blue** tab shows presets available for you to operate with (There are 16).
3. The **dark blue** tab shows the preset you are currently **editing**.

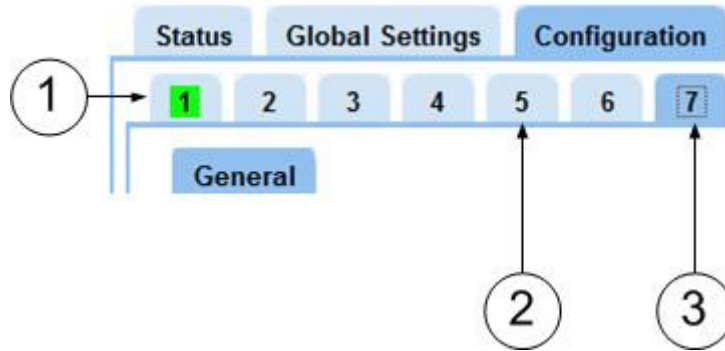


Figure 7-27 Preset Tab Colours

Step 3: Make a Different Preset Available for Editing

1. Click on a **light blue** tab
2. The tab turns **dark blue** and you are **editing** that preset at this time.

Step 4: Make a Different Preset Active on the Receiver

1. Click on a **tab** other than the green one.
2. Click the **Apply** button
3. The tab turns **green** and that preset is in operation on the receiver at this time.

Step 5: Configure the General Pane

Screenshot: General Pane

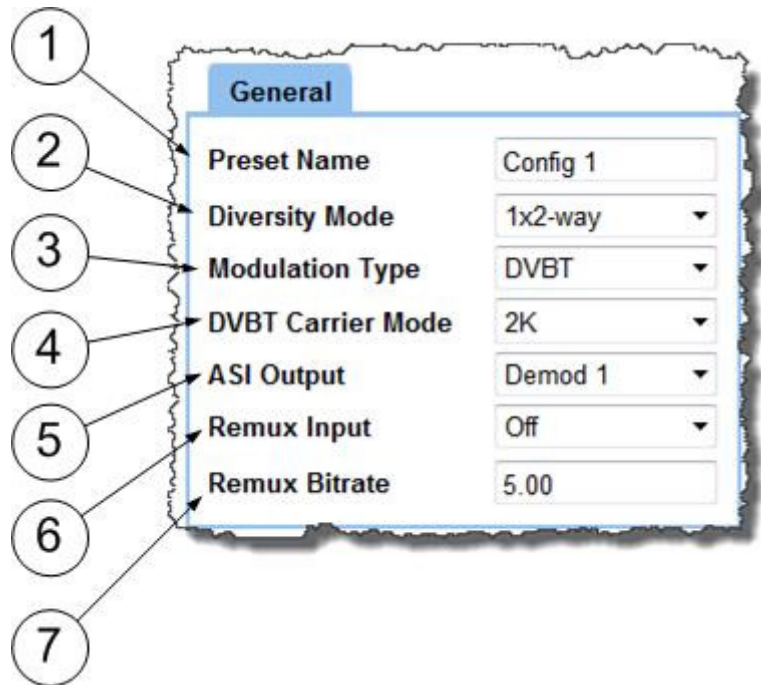
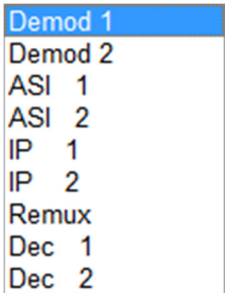
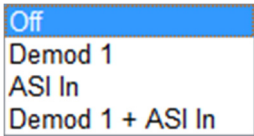


Figure 7-28 General Pane

No	Property	Range	Description
1	Preset Name	Config 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	This is where you set the current configuration.
2	Diversity Mode	<div>1x2-way 1x4-way 1x6-way 1x8-way 2x2-way 2x4-way</div>	The configuration of the diversity and channel configuration of the receiver.

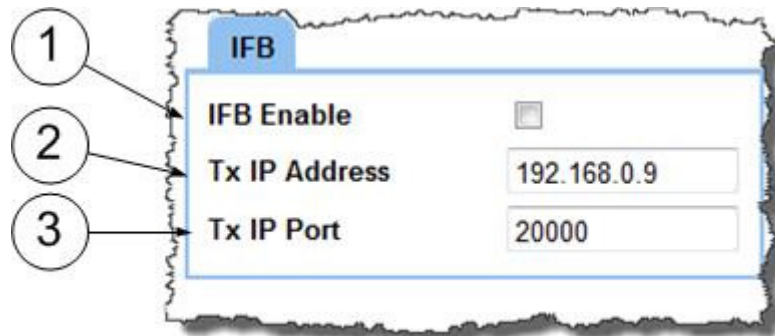
No	Property	Range	Description
3	Modulation type	Narrowband DVBT UMVL	Select the modulation bandwidth you wish to operate with. UMVL- Ultra Mobile Video Link – licence dependant bandwidths. UMVL is a mixture of technologies between DVBT and Narrowband. It is optimised for operation in high speed mobile environments (like car racing for example). UMVL is also excellent when you are operating with high frequency (4 GHz and above) transmissions.
4	DVBT Carrier Mode	2K or 4K	If you selected DVBT as your Modulation Type earlier, you can select how many carriers will be used at this time. 2K=About 2000 4K=About 4000 (dual pedestal mode)
5	ASI Output		The source for the ASI output is selected here. For example if you select Demod 1, then this will send an ASI signal to the ASI Out port. If you select Remux, the ASI Output will be made up of whatever you configure in the Remux Input field.
6	Remux Input		This field enables you to select what you wish to go into the Remux. You can put together sources to be remuxed into one ASI stream. For example, Demod 1+ASI In will let you to have received pictures being combined with a signal from the ASI input port, all being sent to the ASI Output port. For correct operation all PIDs in the input streams must be unique.

No	Property	Range	Description
7	Remux Bitrate	5.00	<p>If you have selected Remux in ASI Output (item 5 in this table) earlier, then this field will be in operation and will let you to set the bitrate for the Remux stream leaving the ASI Output port.</p> <p>You might have remuxed two video signals together which you are then planning to transmit forwards. You could configure the Remux Bitrate to align with your transmitter bandwidth then make sure the two signals you are going to Remux will fit into that space.</p> <p>For correct operation, the bitrate must be the same or higher than the combined bitrate of all input streams.</p>

Table 7-21 – General Pane Key

Step 6: Configure the IFB Pane

Screenshot: IFB Pane

**Figure 7-29 IFB Pane**

No	Property	Range	Description
1	IFB Enable	Select or Clear	<p>When selected the Interruptible fold back system is switched on.</p> <p>The IFB is a special intercom circuit that consists of a mix-minus program feed sent to an earpiece worn by presenter via IP (audio that is being "fed back" to presenter) that can be interrupted and replaced by a television producer's or director's intercom microphone.</p>
2	Tx IP Address	Example: 192.168.2.65	<p>This is the IP Address of the device to which you are sending the fold back. This device is usually be located with the presenter.</p>
3	TX IP Port	20000 Range available is 1024-65535	<p>Protocols like TCP or UDP use port numbers in the header to point traffic around the network. Low port numbers are used by computer systems for predefined tasks. For example SMPT (for your email service) uses port 25.</p> <p>A good rule is to use numbers above 20,000 to stop confliction with existing services.</p> <p>When you set up a port number on many computers on a network they will all listen for packets directed to that port.</p> <p>The default value is 20000.</p>

Step 7: Configure the Demod 1 Configuration Pane

Screenshot: Demod 1 Configuration Pane in each Possible Configuration

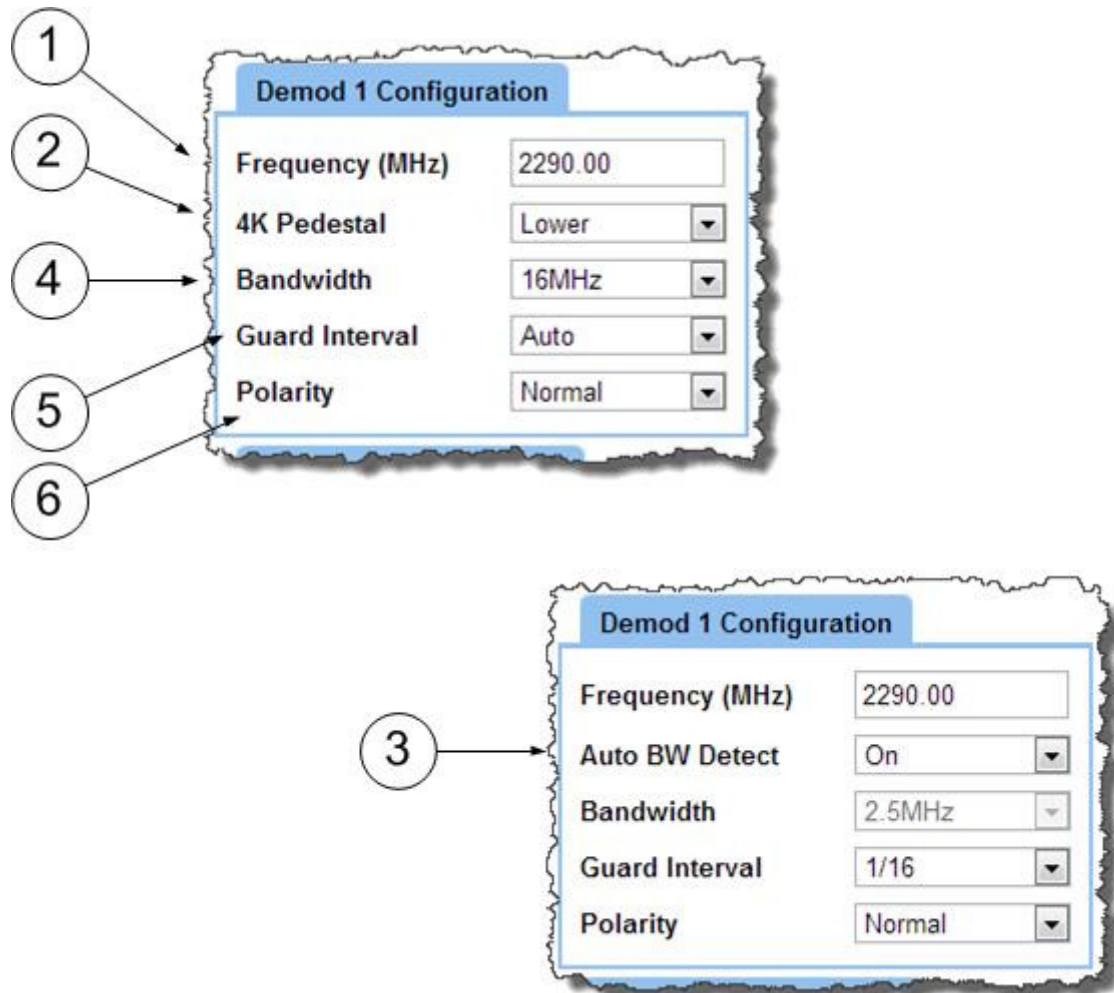


Figure 7-30 Demod 1 Configuration Panes

No	Property	Range	Description
1	Frequency (MHz)	L, S and C Bands	The frequency in megahertz (MHz) that you wish to operate with this preset. If you try to input a frequency that is out of range, the radio will tune the nearest available frequency automatically.
2	4K Pedestal	Lower or Upper	DVBT only and if licensed for dual pedestal mode. Selects which pedestal is demodulated with the centre frequency.

No	Property	Range	Description
3	Auto BW Detect	Off or On	Narrowband only. When on, the receiver will try to automatically find the bandwidth.
4	Bandwidth	DVBT: 6, 7 & 8MHz Narrowband: 2.5MHz 1.25MHz 625kHz	DVB-T bandwidths (usually used for broadcast) Cobham narrowband (usually surveillance) Cobham Ultra-narrowband (this is a licensable item, usually surveillance).
5	Guard Interval	Narrowband: 1/16 or 1/8 DVBT: 1/32, 1/16, 1/8, 1/4	The guard interval which is being applied to the narrowband mode in operation. The guard interval is a deliberate extension of the RF symbol period to give immunity to reflections. 1/16, short extension, deals with fast reflections, more data, less range. 1/8, long extension, deals with slower reflections, less data, more range.
6	Polarity	Normal Inverted Auto	All Cobham equipment must operate in normal mode. The receivers can be used with other manufacturer's products and sometimes it will be necessary to change the polarity to inverted to align with this third party equipment. If you select Auto the receiver will try to automatically select the correct format for you.

Table 7-22 – Demod 1 Configuration Pane Key

Step 8: Configure the Decoder 1 Configuration Pane

Screenshot: Decoder 1 Configuration Pane

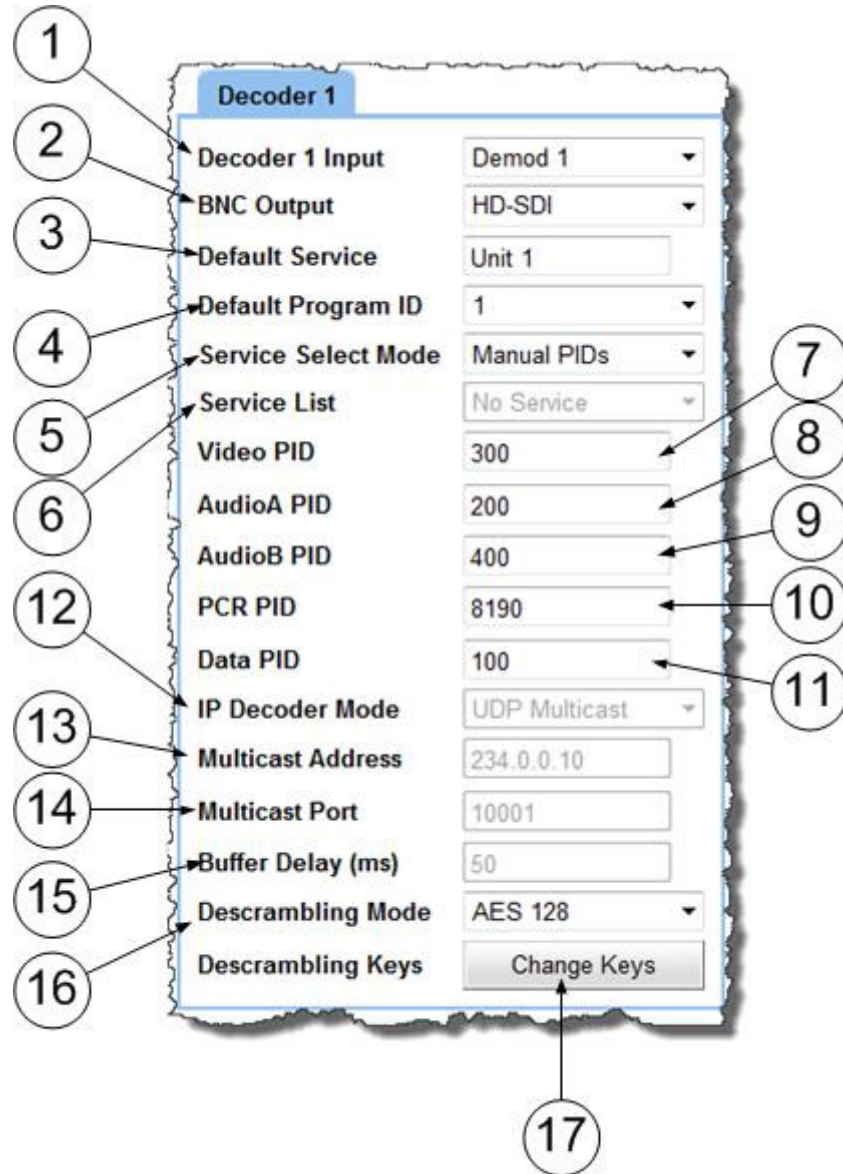


Figure 7-31 Decoder 1 Configuration Pane

No	Property	Range	Description
1	Decoder 1 Input	<div>Demod 1 Demod 2 ASI In 1 ASI In 2 IP Remux</div>	Source feeding the decoder. Licence dependant.
2	BNC Output	<div>HD-SDI Composite ASI</div>	You can select the signal to be passed to the Decoder 1's BNC connector.
3	Default Service	Up to 20 ASCII characters.	The default is Unit 1. If the received stream contains multiple services, this service name will be checked to see if anything is the same and used as preference
4	Default Program ID	1 to 10	This sets which program number in the transport stream will be used on initial power up. If the received stream contains multiple services, this program ID will be checked to see if anything is the same and used as preference.
5	Service Select Mode	Defaults List Manual PIDs	<p>This selects how services in the transport stream will be selected.</p> <p>Defaults – Uses Default Service name and Program ID as set earlier.</p> <p>List – Will show a list of available services in Status > Service > Service List 1 or 2.</p> <p>Manual PIDs - Enables you to select applicable elements from the transport stream like alternative language audio.</p>
6	Service List	H.264 Unit 1 for example.	If you have selected List in Service Select Mode earlier then this field will show a list of available services on the current Transport stream. The selected service from the list will be decoded.
7	Video PID	0x0020 to 0x1FFE	Set the manual Video service PID for decoding
8	AudioA PID	0x0020 to 0x1FFE	Set the manual Audio service PID for decoding

No	Property	Range	Description
9	AudioB PID	0x0020 to 0x1FFE	Set the manual Audio service PID for decoding
10	PCR PID	0x0020 to 0x1FFE	Set the manual PCR PID for clock reference
11	Data PID	0x0020 to 0x1FFE	Set the manual Data service PID for decoding
12	IP Decoder Mode	UDP Unicast UDP Multicast	Only available if you have selected IP In under Decoder 1 input.
13	Multicast Address	239.16.33.254	This text box enables you to change the multicast address to be received by the unit. The default value is 239.16.33.254.
14	Multicast Port	10000 Range available is 1024-65535	<p>Protocols like TCP or UDP use port numbers in the header to point traffic around the network. Low port numbers are used by computer systems for predefined tasks. For example SMPT (for your email service) uses port 25.</p> <p>A good rule is to use numbers above 10,000 to stop confliction with existing services.</p> <p>When you set up a port number on many computers on a network they will all listen for packets directed to that port.</p> <p>The default value is 10333.</p>
15	Buffer Delay (ms)	50ms for example ms – milliseconds.	IP packets can be delivered unevenly across IP which causes jitters. This buffer is designed to make the flow of data smoother by adding a small delay to the stream.

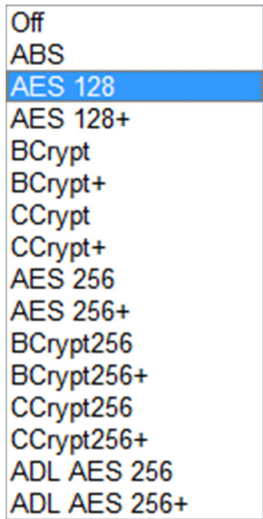
No	Property	Range	Description
16	Descrambling Mode		If you wish to operate descrambling you'll select your mode here. You might not have all the modes shown here as they are licensable features.
17	Descrambling Keys	Change Keys Button.	After selecting a Descrambling Mode, push this button to open the Enter Scrambling Key dialog where you can set the key. <i>See Advanced Operation, Setting up Encryption.</i>

Table 7-23 – Decoder 1 Configuration Pane Key

Note: Demod 2 and Decoder 2 Configuration are set up the same as Demod 1 and Decoder 1.

7.10 Working with the Copy from Config Button

Sometimes you wish to assemble a new configuration from one that exists. For example, you might have a complex configuration you like to operate with but find it necessary to change the frequency. The **Copy from Configuration** button makes this very simple.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Configuration Tab

1. Click on the **Configuration** tab.
2. The Configuration Page opens.

Step 2: Select the Preset you wish to Setup

3. Click on a **Config** tab. I've chosen config 3 in my example. It turns **dark blue** which means you are **editing** that config.

Step 3: Open the Choose Options to Copy Window

4. Click the **Copy from Config** button.
5. The **Choose Options to Copy** window opens.
6. Select a **Config** to copy options **from**. I've chosen Config 1 in my example.
7. **Select** items you wish to be copied **to** your new preset.
8. Click the **OK** button.
9. You'll see the **Saved Successfully** message box.
10. Click the **OK** button.
11. All the configs you selected from Config 1 are pasted into config 3 at this time.

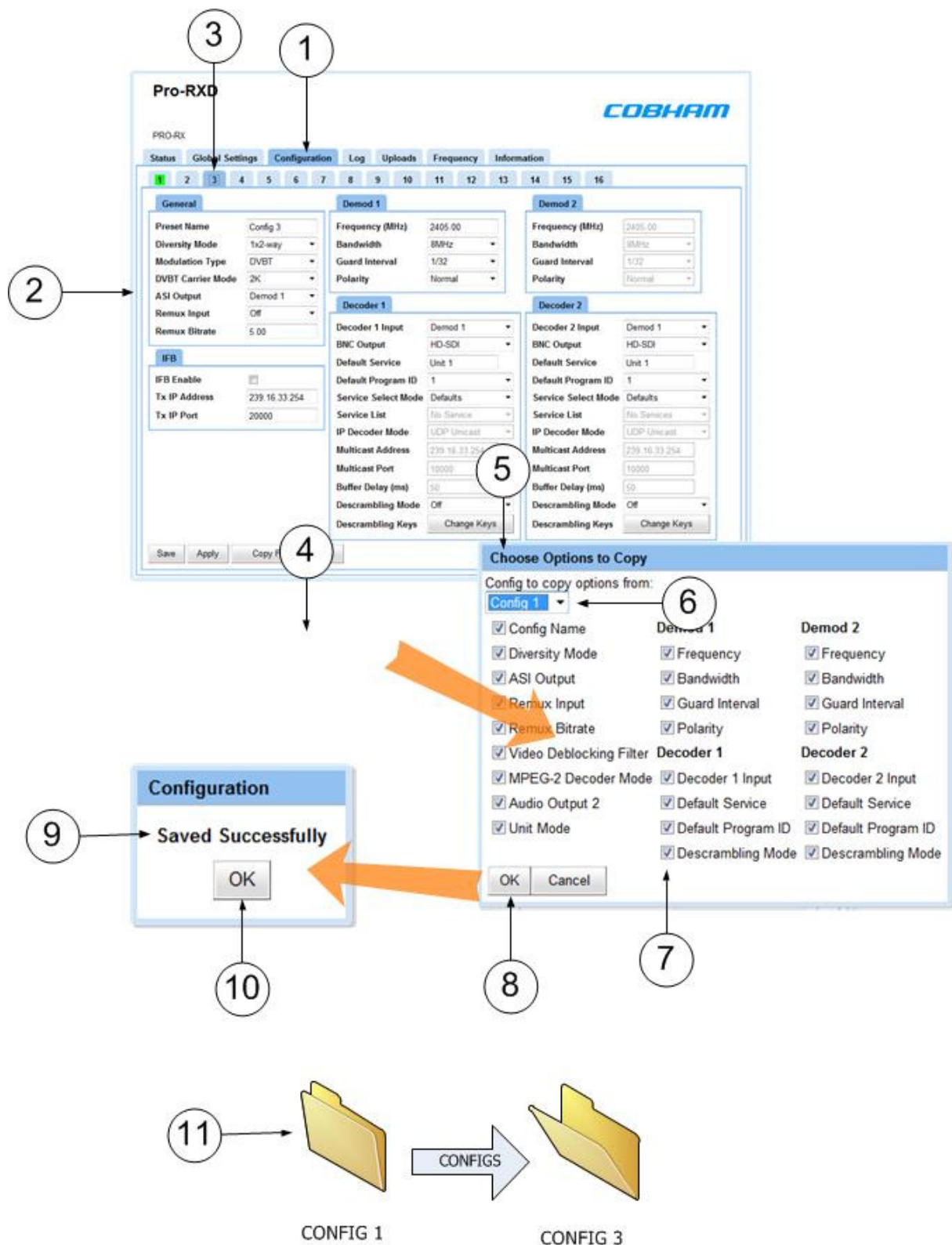


Figure 7-32 Working with the Copy from Config Button

7.11 Working with the Log Tab

The PRORXD receiver generates log files of receiver status information.

Before you Start

It is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Log Tab

1. Click on **Log** tab.

Screenshot: Log Tab

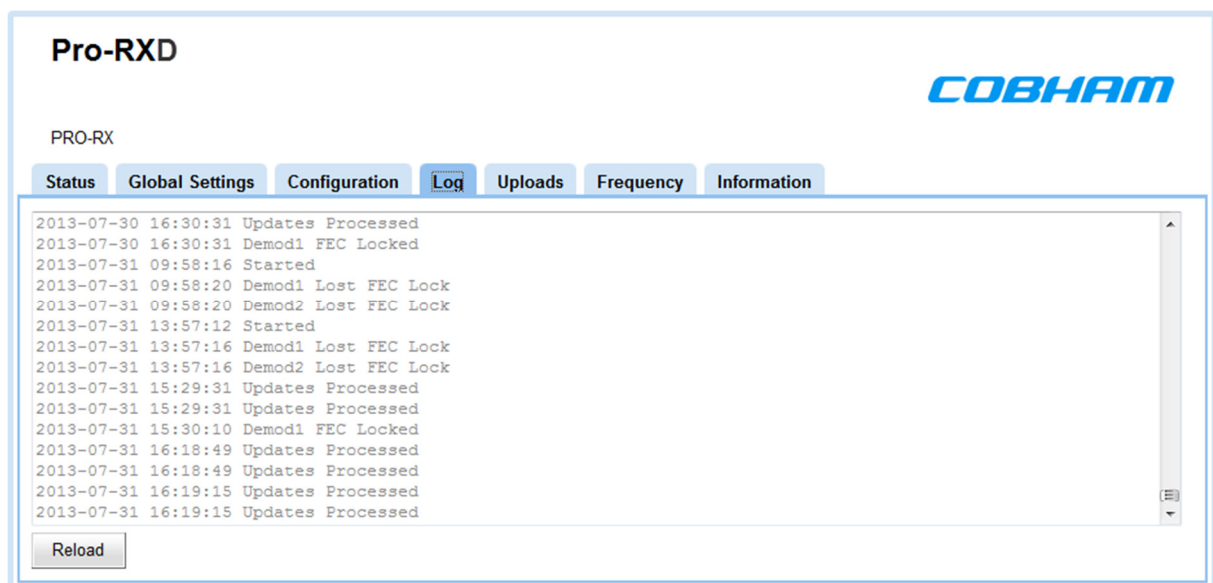


Figure 7-33 Log Tab

Step 2: Interpret the Information Presented in the Log Tab

The log tab shows events with time information. The events logged include stream errors and software updates processed.

Step 3: Reload Button

Click the **Reload** button to make a reload of the page data.

7.12 Working with the Upload Tab

This page enables you to upload a license file, enable licensable features, or send software upgrade files to the PRORXD.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Uploads Tab

1. Click on **Uploads** tab.

Screenshot: Uploads Tab

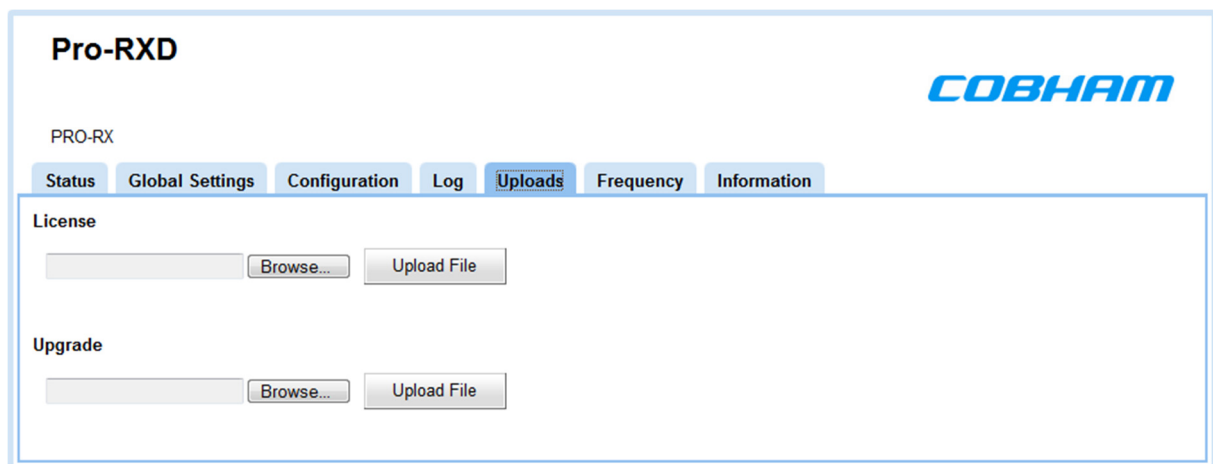


Figure 7-34 Uploads Tab

Step 2: Upload a New License File

If a new licensable feature is purchased for a unit then a new license code has to be programmed into the PRORXD to let you operate it.

Cobham will make a new license file (with the file extension .lic) which we will send to you.

1. Open the **Uploads** Tab
2. Click the **Browse** button near to the **Licence** text box
3. The **Choose File to Upload** window opens
4. Navigate to the .lic file we sent you
5. Click **Open**
6. Check the **correct file** is shown in the **Licence** text box
7. Click **Upload File**
8. The licence is written to the unit, you'll see a **message**

9. After **rebooting** the unit, the new features will be available.

Step 3: Upgrade your PRORXD

When a new software release is available for the PRORXD, Cobham can supply customers with a software upgrade.

Cobham can make a new upgrade file (with the file extension .upg) which we will send to you.

1. Open the **Uploads** Tab
2. Click the **Browse** button near to the **Upgrade** text box
3. The **Choose File to Upload** window opens
4. Navigate to the .upg file we sent you
5. Click **Open**
6. Click **Upload File** – it will be about five minutes.
7. The upgrade is applied to the unit, you'll see a **message**.
8. After rebooting the unit, the new features will be enabled.

7.13 Working with the Frequency Tab

The **Frequency** tab enables you to scan the spectrum around you within a **bandwidth** and **resolution** of your choice.

You can operate the **Find** item which will tag the strongest signals and report their frequencies to you.

You can operate the **Cycle** button to select found frequencies in turn and if you wish you can push the **Select** button which will make that frequency currently in operation in your PRORXD.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Frequency Tab

1. Click on **Frequency** tab.

Screenshot: Frequency Tab

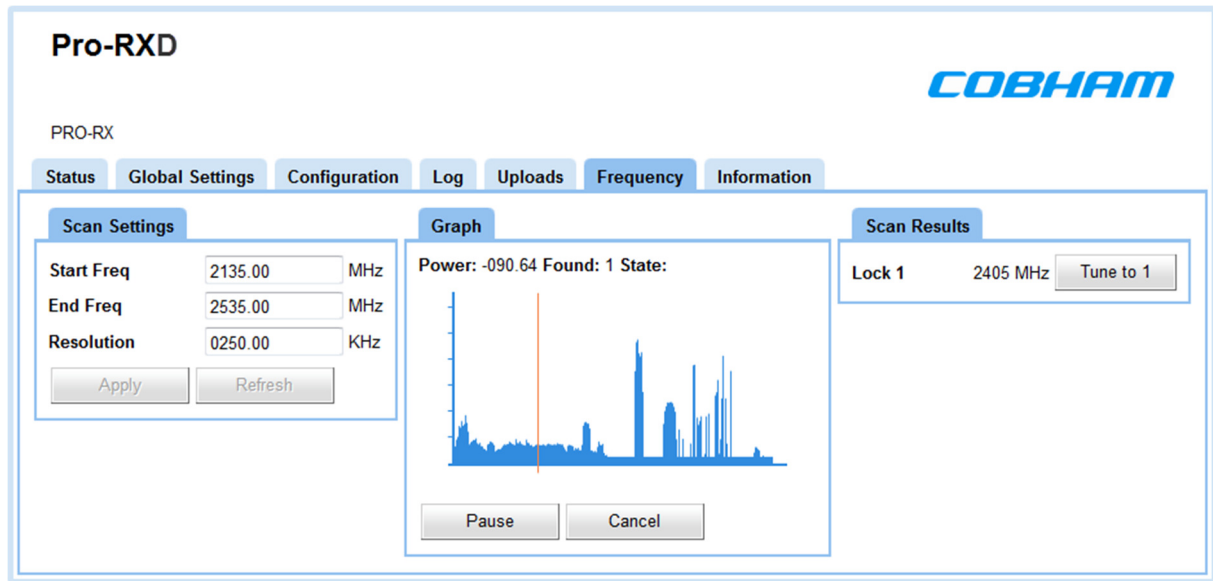


Figure 7-35 Frequency Tab

Step 2: Configure the Scan Settings Pane

1. Click the **Refresh** button – this resets scans in the frequency scanner made before.
2. Type in the **Start** frequency in MHz you wish to use for your Frequency scan. If you type a frequency that is too low the Start frequency will set itself to the lowest frequency this PRORXD can do.
3. Type in the **End** frequency in MHz you wish to use for your Frequency scan. If you type a frequency that is too high the End frequency will set itself to the highest frequency this PRORXD can do.

Note: The wider the band you wish to scan with the Start and Stop values, the longer the scan will be.

4. Type in the **Resolution** frequency in MHz you wish to use for your Frequency scan. If you type a very small resolution like 0.5 MHz the scan will find many more individual frequencies but the scan will be much longer. Operating with a larger resolution will speed up the scan but can miss very small frequency steps.
5. Click the **Apply** button.
6. The **Scan Settings** message window opens.
7. Click the **OK** button.

Screenshot: Scan Settings Pane

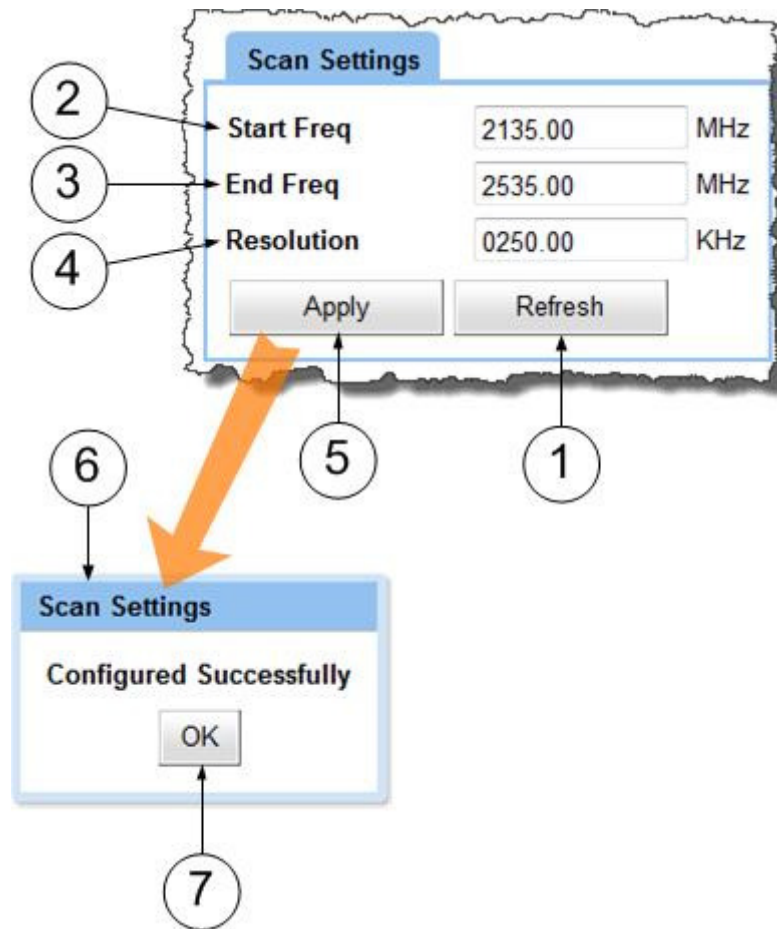


Figure 7-36 Scan Settings Pane

Step 3: Start the Scan

1. Click the **Start** button.
2. The **Confirm Scan** message window opens. This reminds you that all usual operations will stop.

CAUTION: This means the receiver will stop channel it is receiving. Do not operate the scan if the receiver is on air!

3. Click the **OK** button.
4. Look at the **graphical display** of the scan. The orange line will move across the screen drawing a graph of RF power levels. The **State** indicator shows **scanning**.
5. You can click the **Pause** button if you wish at this time. Click the **Continue** button to let the scan continue.
6. After the scan, there is a **testing** phase – please wait until this is finished.

Screenshot: Graph Pane

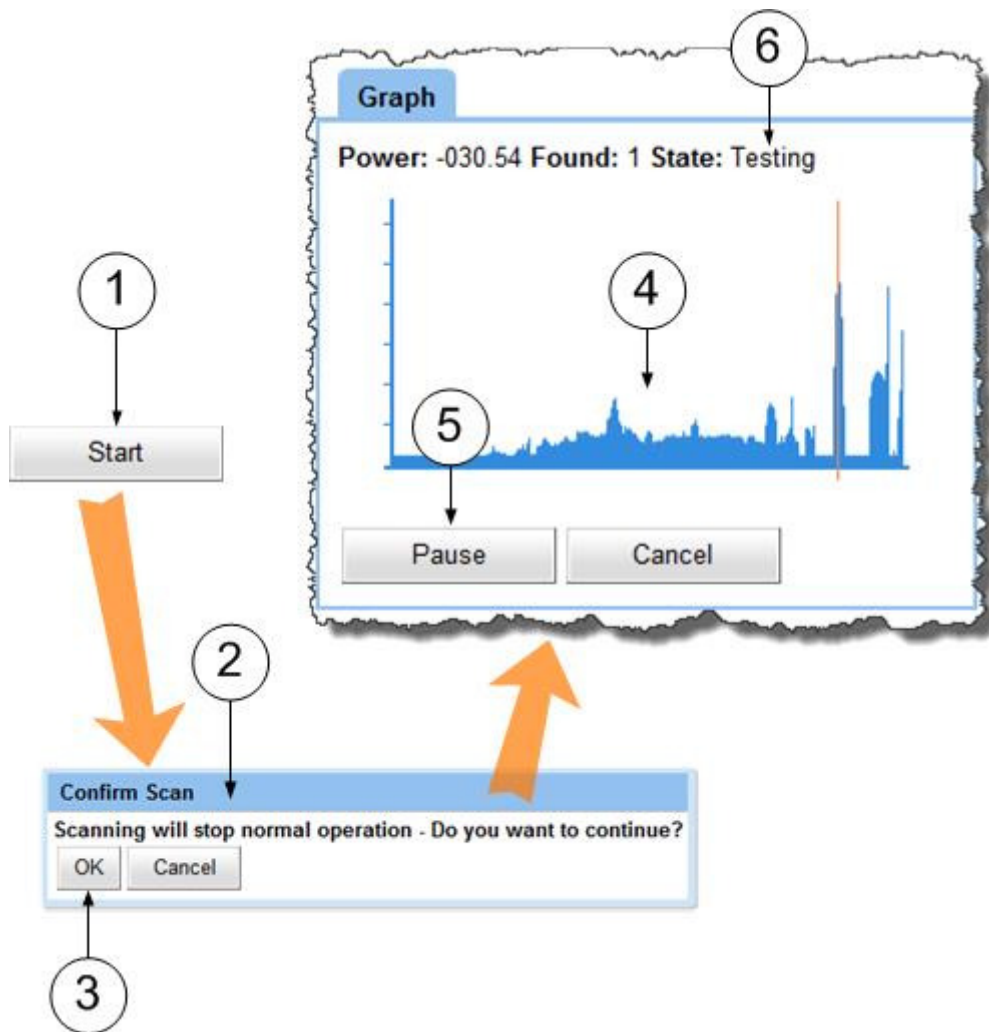


Figure 7-37 Graph Pane

Step 4: Check the Scan Results

1. Look at the **Scan Results** pane – It will list frequencies it has found that it can tune for you.
2. Click the **Tune to** button for your required channel.
3. The **Channel Details** window opens. It tells you some things about the channel like its frequency and bandwidth for example.
4. If you wish the PRORXD to tune to this channel, push the **Yes** button. This will save the channel configuration parameters on the currently operating configuration preset.
5. If you wish the PRORXD to keep on its current channel, then push the **No** button.

Screenshot: Scan Results Pane

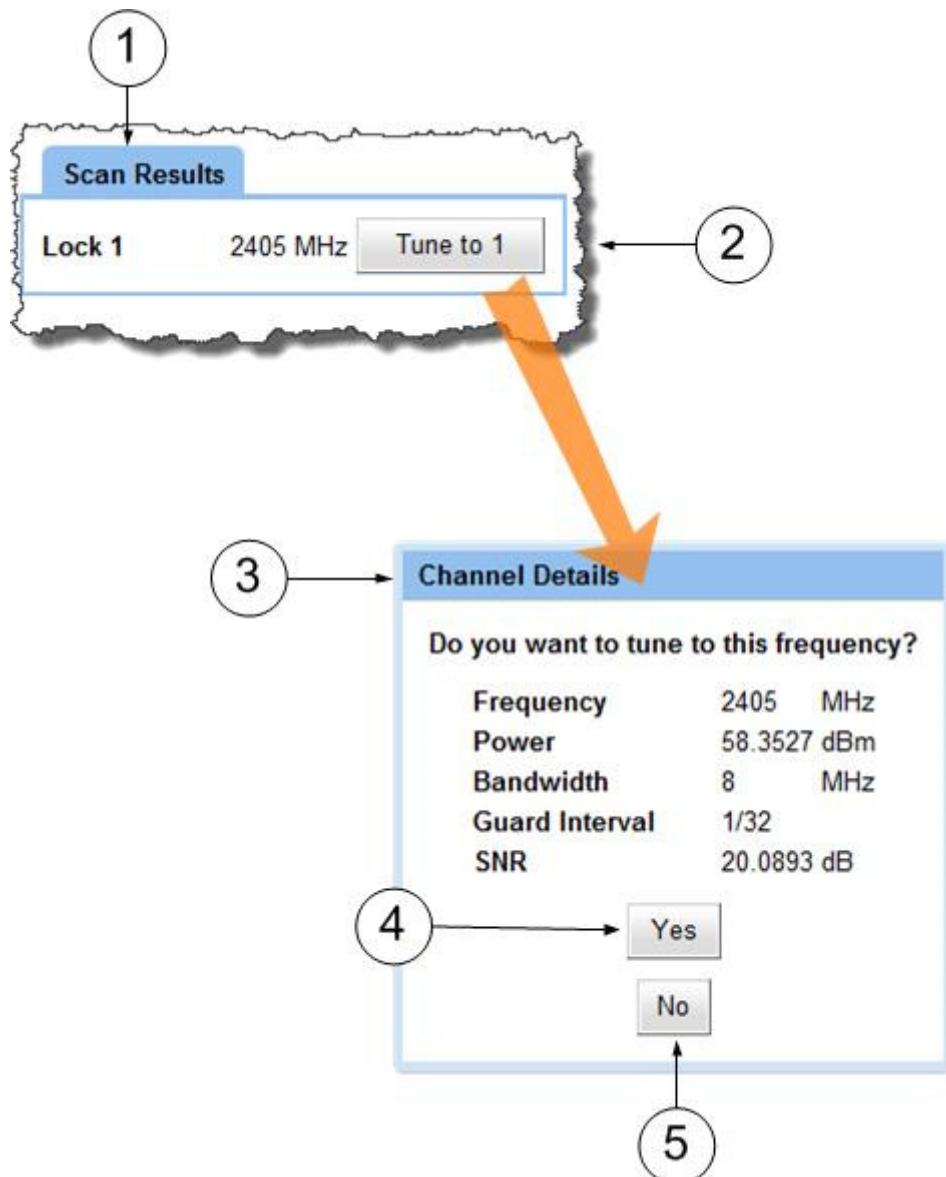


Figure 7-38 Scan Results Pane

7.14 Working with the Information Tab

The Information tab contains generic information like software versions and unit special data. It will be necessary to have this information during a support call for example.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Information Tab

1. Click on the **Information** tab.

Screenshot: Information Tab

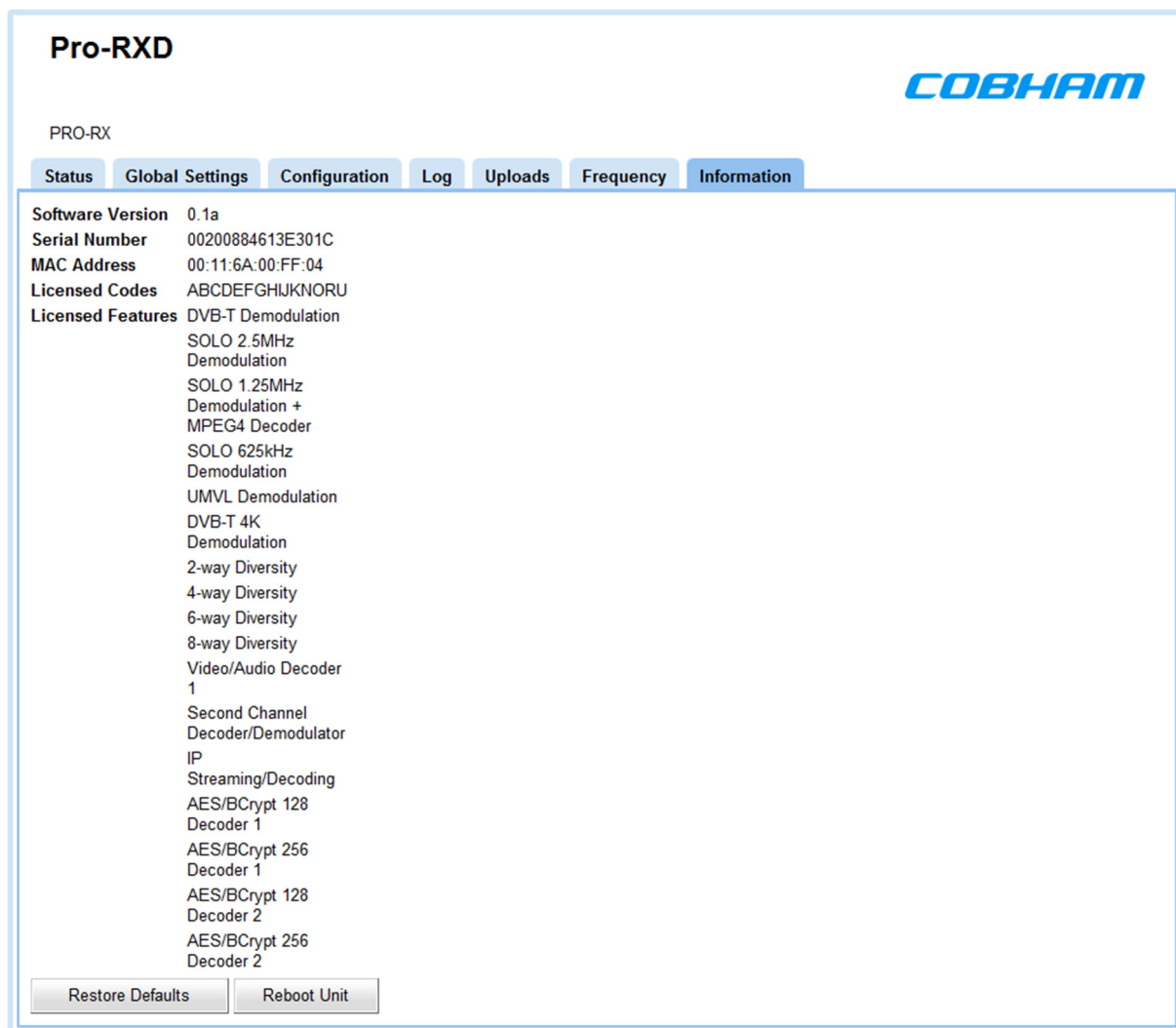


Figure 7-39 Information Tab

Step 2: Check the Software Version

This field returns the current version of software loaded onto the PRORXD unit. When you do an upgrade, it will be necessary to look here to see that the upgrade is correct.

Step 3: Check the Serial Number

During a support call it will be necessary for you to tell us the Serial Number of your PRORXD. This is where you find it.

Step 4: Check the MAC Address

Media Access Control Address (MAC) is reported by this field. This is necessary if you are involved in network operations with your PRORXD.

Step 5: Check the Licenced Codes

Cobham products use licence codes to switch features on and off in your device. Each item has a letter and your licence is made up of many of these letters.

Step 6: Check the Licensed Features

The **Licensed Features Pane** is a list of all the licensed features on this device.

8. Appendix A – Cautions and Warnings

8.1 Cautions and Warnings

Serial	Area	Note
1	Enclosures	<p>Do not remove factory installed screws or fastenings. Damage to the units can be caused and void warranties.</p> <p>Only approved personnel must open the device. There are no operations that required the user to access the device internally. There are no user serviceable parts internally.</p>
2	Maintenance	<p>Other than cleaning, no scheduled maintenance is required to make sure of the correct operation of the unit.</p>
3	Environment	<p>The equipment must not be used in dangerous or atmospheres that can cause corrosion. Users are reminded of the necessity of complying with restrictions regarding the operation of radio devices in refuel depots, chemical plants and locations where explosives are kept and/or used.</p>
4	Power Supply	<p>Make sure that the power supply arrangements are sufficient to align with the requirements of each device. Obey all electrical safety precautions.</p>
5	Electro Static Discharge (ESD) Precautions	<p>ESD guidelines must be followed for this electrostatic sensitive device.</p>
6	Lightning Hit	<p>There is a risk of lightning hits to antennas. The equipment must not be assembled in an area during lightning. Antennas must be adequately protected from lightning hits.</p>
7	Working at Height	<p>You must be careful when locating the device at height, for example on a mast. Make sure the unit is correctly attached to stop it falling and injuring personnel.</p>
8	Risk of Eye Injury	<p>You must be careful to stop your eye touching the antennas.</p>
9	Cables	<p>Connecting cables must not be put where they can become damaged or where they can be dangerous by personnel tripping on them.</p>

Serial	Area	Note
10	Thermal Control System	Energized devices always become hot during operation. If you operate this device in a closed area you must make sure it has sufficient airflow to keep it at a low temperature. Also, if worn near the body, you must be careful to give protection the operator from large temperatures.
11	RF Emission System	When operating this device please make sure a distance of 20cm is kept between your device and your body while the device is transmitting.
12	Aircraft Safety	Operating this equipment on board aircraft is not permitted. Operating radio transmitter equipment in an aircraft can be dangerous to navigation and other systems.

Table 8-1 – Cautions and Warnings

8.2 EMC / Safety and Radio Approvals

The equipment has been designed to align with, and has been tested against these harmonized EMC and safety standards:

8.3 CE Marking

The CE mark is attached to all products, and the CE Declaration of Conformity, as well as the technical file is available on request.

9. Appendix B - Precautions and Maintenance

9.1 Caring for your Equipment

- Do not apply physical abuse to the unit, too much shock or vibration.
- Do not let it fall.
- Do not shake or throw the unit.
- Do not carry the unit by the antenna.
- Prevent exposure to too much moisture or liquids.
- Do not submerge the unit unless it is designed to be submersible.
- Do not let the unit touch corrosives, solvents, cleaners or mineral spirits.
- Prevent exposure to too much cold or hot.
- Prevent too long exposure to direct sunlight.
- Do not put or keep units on surfaces that are not stable.
- Always turn the unit off before installing optional accessories.
- Only use accessories intended for the specified make and model of your unit, especially batteries, chargers and power adapters

9.2 Charging

- Use approved batteries, chargers and adapters designed specially for your make and model unit.
- Do not try to charge a wet unit or battery pack.
- Do not charge the unit or battery pack near anything flammable.
- Let the battery pack become stable at room temperature (72 degrees F) before charging.
- Do not charge units and / or battery packs on surfaces that are wet or not stable.
- Do not keep units and / or batteries in chargers for too long.

9.3 Working with Lithium Batteries

- Charge only with the approved charging cable.
- Batteries are to be used only for the specified function. Incorrect operation will invalidate the warranty and can make the battery become dangerous.
- Charge in a clean, dry environment, ideally at 10 degrees Celsius. (0 to 45 degrees Celsius is permitted).
- Do not keep or operate in direct sunlight for extended periods. Battery can be damaged by becoming too hot, for example if put on the rear parcel shelf of a vehicle.

- Keep in a cool and dry environment. Being kept too hot can cause permanent loss of capacity.
- For short term (fewer than six months), keep in a fully charged condition.
- For extended periods (more than one year) charge before keeping and charge at intervals of six to nine months.
- Always fully charge the battery after a period of more than one month before operation.
- Do not keep the battery with the charge low as this can cause the battery to become unserviceable and invalidate the warranty.
- Do not short circuit.
- Do not put in water.
- Do not burn. Cells are likely to explode if put in a fire.
- Dispose of batteries in accordance with the regulations for the Country of operation. Batteries are usually thought of as 'isolated waste' and must not be in the usual waste stream. Send to the seller, or send to an approved recycling company.

9.4 Cleaning

- Turn off the unit and remove batteries (if applicable) before maintenance.
- Use a clean, soft, moist cloth to clean the unit. A microfiber cloth is recommended.
- Do not use alcohol or cleaning solutions to clean the unit.
- Do not put the unit in water to clean it.
- If the unit becomes wet, immediately dry it with a microfiber or other lint-free cloth.

9.5 Storage

- Turn off the unit and remove batteries before storage
- Keep units and battery packs in a cool, dry area at room temperature (72 degrees F).
- Do not keep units and / or batteries in chargers which are on.

9.6 Repairs

Do not try to repair the unit. The unit contains no user serviceable parts. Speak to the Cobham Customer Servicing Centre or send it to an approved repair technician.

9.7 Getting Technical Support

Step 1: Speak to Client Services

Technical support enquiries must be sent to the Client Services team.

Post: The Cobham Centre-Solent, Fusion 2, 1100 Parkway, Solent Business Park, Whiteley, Hampshire, PO15 7AB, England.

Phone: +44 1489 566 750 then push 1 for support. Office hours: 0900-1700 UK time not including holidays.

Email: tcs.whiteley.support@cobham.com (no restricted content).

For technical support we plan to give a first response to you in less than one working day and a progress update at intervals of two weeks at least.

9.8 Operate with the Cobham RMA Service

If you have a problem and all troubleshooting steps have not worked, you must speak to Cobham for Return Material Authorisation (RMA) Service.

Step 1: Email Cobham

To send something to Solent please Email tcs.whiteley.rma@cobham.com. We will then send you an RMA request form to complete and send to us. We'll then send you an RMA number and shipping instructions.

Step 2: Keep your Personal Kit

Remove all personal kit or media from the device.

Step 3: Put the Unit into the Box

Use the initial shipping container and packing materials if possible.

If the initial packing materials are not available, put the equipment in soft material (e.g. PU/PE foam) then put the wrapped equipment into a hard cardboard shipping box.

Step 4: Prepare an Information Sheet

Include a sheet with these items of information:

- Name
- Address
- Unit Serial Number
- Date of Purchase or the initial invoice number
- Date of problem
- A detailed description of the problems you have encountered
- A record of the hardware / software configuration if applicable

Note: Please keep a copy of this sheet for your records.

Step 5: Put the RMA Number on the Box

Clearly identify the outer surface of the shipping box with the RMA number. If an RMA number is not on the shipping box, receiving cannot identify it and it might be sent to you again.

Step 6: Send the Box to Cobham

Send the box with your usual shipping procedure.

10. Appendix C-Glossary

10.1 Glossary

0-9	Means...
16QAM	16-state Quadrature Amplitude Modulation.
64QAM	64-state Quadrature Amplitude Modulation.

A	Means...
AC	Alternating Current. Current that is continually changing in magnitude and at intervals in direction from a zero reference level.
A/V	Audio/Video.
AES	In cryptography, the Advanced Encryption Standard (AES) is an encryption standard adopted by the U.S. government. The standard comprises three block ciphers, AES-128, AES-192 and AES-256, adopted from a larger collection originally published as Rijndael . Each AES cipher has a 128-bit block, with keys of 128, 192 and 256 bits, respectively.
ASI	Asynchronous Serial Interface. A streaming data interface which often carries an MPEG Transport Stream. An ASI signal can carry one or multiple SD, HD or audio programs that are already compressed, not like an uncompressed SD-SDI (270Mbps) or HD-SDI (1.45Gbs). An ASI signal can carry differing quantities of data but is always padded to operate at a fixed line rate of 270 Mb/s.
Amplification	Increasing the strength (current, voltage or power) of a signal.
Amplitude	The level of an audio or other signal in voltage or current. The magnitude of variation in a changing quantity from its zero value.
Amplitude Modulation	Modulation in which the amplitude of the carrier wave is varied above and below its usual value in accordance with the intelligence of the signal being transmitted. Also called AM.
Analogue	Analog transmission is a transmission method of conveying voice, data, image, signal or video information with a continuous signal which varies in amplitude, phase, or some other property in proportion to that of a variable.

A	Means...
Antenna	An antenna (or aerial) is a transducer designed to radiate or receive electromagnetic energy (generally RF).
Antenna Bandwidth	The frequency range over which a given antenna will accept signals.
Antenna Gain	The effectiveness of a directional antenna as compared to a standard non-directional antenna. It is usually expressed as the ratio in decibels of standard antenna input power to directional antenna input power that will make the same field strength in the wanted direction. For a receiving antenna, the ratio of signal power values produced at the receiver input terminals is used. The more directional an antenna is, the higher is its gain.
Attenuation	Power loss resulting from conductor resistance and dielectric loss in the insulating material used to isolate the conductors.

B	Means...
BNC	Bayonet Neill-Concelman – A very well-known type of RF connector used for terminating coaxial cable.
Bandwidth	The width of a band of frequencies used for a function.

C	Means...
COFDM	Coded Orthogonal Frequency Division Multiplexing is a frequency-division multiplexing (FDM) scheme utilized as a digital multi-carrier modulation method. A large number of closely-spaced orthogonal sub-carriers are used to carry data.

D	Means...
D/C	Downconverter. A device which changes microwave frequencies to UHF frequencies for operation in Cobham receivers.
Digital	A digital signal is a discontinuous signal that changes from one condition to one more condition in discrete steps.
Decibel	The standard unit used to express transmission gain or loss and relative power levels. Also written as dB.

D	Means...
Decoder	Processor in a video receiver that changes digital video data to analogue signals for replay on analogue monitors; or in some cases a software decoder, a program that decodes digital data for replay on the PC (decompression etc.).
Demodulate	To collect the information originally impressed on the radio wave.

E	Means...
Electromagnetic field	The field of force that an electrical current produces around the conductor through which it flows.
Electromagnetic Waves	A wave propagating as a periodic disturbance of the electrical and magnetic fields and having frequency in the electromagnetic spectrum; the means by which energy is transmitted from one area to one more area.
Elementary Stream (ES)	Elementary streams: These streams contain only one MPEG-2 video channel and no audio. Elementary streams are required if you intend to operate Milestone or a player that cannot operate with Transport streams. You must be in RTSP mode to operate Elementary streams.
Encoder	A processor in a video transmitter which changes analogue video from a camera to digital data.

F	Means...
FEC	Forward Error Correction is a system of error control for data transmission, whereby the sender adds redundant data to its messages, also known as an error-correction code . This lets the receiver find and correct errors (inside some bound) without the need to ask the sender for additional data. The advantage of forward error correction is that a back-channel is not required, or that retransmission of data can often be prevented, at the cost of higher bandwidth requirements on average. FEC is thus applied in situations where retransmissions are relatively costly or impossible.
Firmware	Software which is installed directly on a device and is intended specially for that device and is used to control it.
FOV	Field of View - The field of view (also field of vision) is the angular quantity of the observable world that is seen at a given moment.

F	Means...
Fading	A periodic decrease in the received signal strength.
Frequency	The rate at which a procedure repeats itself. In radio communications, frequency is expressed in cycles for each second. Signals also have a property called wavelength, which is inversely in proportion to the frequency.
Frequency Modulation	Changing the frequency of a carrier wave, usually with an audio frequency, to send intelligence. Also called FM .
FPGA	Field-Programmable Gate Array - an integrated circuit designed to be configured by the customer or designer after manufacturing, hence "field-programmable".

G	Means...
GUI	Graphical User Interface.
GHz	Gigahertz - One gigahertz is equal to 1,000 megahertz (MHz) or 1,000,000,000 Hz.
Gain	The increase in signal strength that is produced by an amplifier.

H	Means...
Hertz	One cycle for every second.

I	Means...
IP Address	Internet Protocol Address – A unique numeric ID for a device in a network.
IR	Infra-Red - Infrared (IR) radiation is electromagnetic radiation whose wavelength is longer than that of visible light.
Impedance	The total opposition offered by a circuit or component to the flow of alternating current.

L	Means...
LOS and NLOS	Line-of-sight propagation refers to electro-magnetic radiation including light emissions moving in a straight line. The rays or waves are diffracted, refracted, reflected, or absorbed by atmosphere and obstructions with material and usually cannot move above the horizon or behind obstacles. NLOS is Non Line-of-sight.
Load	A device that consumes electrical power.
Lux	The lux (symbol: lx) is the SI unit of illuminance and luminous emittance. It is used in photometry as a measure of the <i>apparent</i> intensity of light hitting or passing through a surface.

M	Means...
MHz	Megahertz is the same as 1,000,000 Hz
mW	Milliwatt - The milliwatt (symbol: mW) is equal to one thousandth (10^{-3}) of a watt.
MPEG	Moving Pictures Experts Group.
Modulation	To change the output of a transmitter in amplitude, phase or frequency in accordance with the information to be transmitted. Data is superimposed on a carrier current or wave by means of a procedure called modulation. Signal modulation can be done in one of two ways: analogue and digital. In recent years, digital modulation has been getting more usual, while analogue modulation methods have been used less. There continues to be plenty of analogue signals around, but, and they will probably not become totally extinct.
Multicast	Multicasting is sending data from a sender to multiple receivers where each receiver signals that they <i>want</i> to receive the data.

N	Means...
nm	A nanometre (American spelling: nanometer ; symbol nm) is a unit of length in the metric system, equal to one billionth of a metre (i.e., 10^{-9} m or one millionth of a millimetre).

N	Means...
NMEA 0183	NMEA 0183 is a combined electrical and data specification for communication between marine electronic devices such as echo sounder, sonar, anemometer, gyrocompass, autopilot, GPS receivers and many other types of instruments. It has been specified by, and is controlled by, the U.S.-based National Marine Electronics Association.
NTSC	National Television Systems Committee.
Noise	Random pulses of electromagnetic energy generated by lightening or electrical equipment.

O	Means...
Omni directional antenna	An antenna radiation pattern that shows the same radiation in all horizontal directions.
Oscillation	A periodic, repetitive movement or set of values (voltage, current, velocity).

P	Means...
PAL	Phase Alternate Line.
PIR	Passive Infra-Red sensor (PIR sensor) is an electronic device that measures infrared (IR) light radiating from objects in its field of view.
PTZ	Pan, Tilt and Zoom – PTZ is a usual description of controllable cameras.
Propagation	A phenomenon by which a wave moves from one point to a second point; the movement of electromagnetic waves through space or along a transmission line.

Q	Means...
QPSK	Quadrature Phase Shift Keying.

R	Means...
RF	Radio Frequency.

R	Means...
RTSP	Real Time Streaming Protocol (RTSP) is a network control protocol designed for operation in entertainment and communications systems to control streaming media servers. The protocol is used for establishing and controlling media sessions between end points. Clients of media servers issue VCR-like commands, such as play and pause, to let real-time control of playback of media files from the server.
Rx	Receiver , an electronic device that changes a radio signal from a transmitter into useful information.
Radiate	To transmit RF energy.
Radio Frequency	Frequency of electrical energy capable of propagation into space (usually above 20kHz). Also called RF.

S	Means...
SNR	Signal to Noise Ratio is an electrical engineering measurement specified as the ratio of a signal power to the noise power corrupting the signal. Signal-to-noise ratio compares the level of a desired signal (such as music) to the level of background noise. The higher the ratio, the less obtrusive the background noise is.
Shannon Limit	The Shannon limit or Shannon capacity of a communications channel is the theoretical maximum information transfer rate of the channel, for a noise level.
Signal	In electronics, a signal is an electrical current or electromagnetic field used to send data from one area to a second area. The simplest type of signal is a direct current (DC) that is switched on and off; this is the principle by which the earliest telegraph worked. More complex signals consist of an alternating-current (AC) or electromagnetic carrier that contains one or more data streams.
Streaming	Streaming is the transmission of digital audio or video or the listening and viewing of such data without first storing it.

T	Means...
Tx	A transmitter is an electronic device which, usually with the aid of an antenna, propagates an electromagnetic signal such as radio, television, or other telecommunications.

T	Means...
TNC	The TNC (threaded Neill-Concelman) connector is a threaded version of the BNC connector. The connector has a 50 Ω impedance and operates best in the 0–11 GHz frequency spectrum.
Transport Stream (TS)	Transport streams: These streams can contain some MPEG-2 content channels and related audio. All the channels are multiplexed together, letting the receiver select which to play back.

U	Means...
UDP	User Datagram Protocol (UDP) Sometimes called fire and forget because there is no dialog between the sender and receiver. If the receiver does not receive a packet, the sender will not know. But, UDP is very satisfactory when there is a small risk of errors (like in your LAN), or when TCP can give "too late" delivery.
USB	Universal Serial Bus.
UVMS	Universal Video Management System , a network video recorder storage solution from BAE Systems. Gives full archiving coupled with live and retrospective viewing.
Unicast	Unicast is simply sending packets from one source to one destination. For example, from one web server to one (or each) person viewing a page on a web browser.

V	Means...
VHF	Very High Frequency – 30 MHz to 300 MHz
V	Volt.
Viterbi Decoder	A Viterbi decoder uses the Viterbi algorithm for decoding a bit stream that has been encoded using forward error correction based on a Convolutional code.

W	Means...
Watt	The watt (symbol: W) is a derived unit of power in the International System of Units (SI). It measures rate of energy conversion. One watt is equivalent to 1 joule (J) of energy per second.
Waveform	Signal shape.
Waveguide	A specially formed hollow metal tube, usually rectangular in shape in cross section, used to connect a High Power amplifier to the antenna.

11. Appendix D - Downconverter Data

11.1 About Downconverters, Square

Product	LO Frequency	LO Side	Gain (Standard)	Gain (High Gain)
DC-100140	1700MHz	High	9dB	19dB
DC-168185	1050MHz	Low	9dB	19dB
DC-225265	1880MHz	Low	9dB	19dB

11.2 About Downconverters, Barrel

Product	LO Frequency	LO Side	Gain (Standard)	Gain (High Gain)
DCB-100150	1800MHz	High	9dB	19dB
DCB-150200	2300MHz	High	9dB	19dB
DCB-200250	1700MHz	Low	9dB	19dB
DCB-250300	2200MHz	Low	9dB	19dB
DCB-300350	2700MHz	Low	9dB	19dB
DCB-450500	4200MHz	Low	9dB	19dB
DCB-550600	5200MHz	Low	9dB	19dB

11.3 About Downconverters, Barrel, Gain Selectable, TNC-TNC

Product	LO Frequency	LO Side	Gain (Standard)	Gain (High Gain)
DCBGS-100150	1800MHz	High	10dB	30dB
DCBGS-167203	2350MHz	High	10dB	30dB

Product	LO Frequency	LO Side	Gain (Standard)	Gain (High Gain)
DCBGS-203255	1720MHz	Low	10dB	30dB
DCBGS-310360	2750MHz	Low	10dB	30dB
DCBGS-440500	4150MHz	Low	10dB	30dB
DCBGS-550600	5200 MHz	Low	10dB	30dB

11.4 About Downconverters, Barrel, Gain Selectable, Broadcast, N Type to BNC

Product	LO Frequency	LO Side	Gain (Standard)	Gain (High Gain)
DCBGSB-167203	2350 MHz	High	10dB	30dB
DCBGSB-203255	1720 MHz	Low	10dB	30dB
DCBGSB-310360	2750 MHz	Low	10dB	30dB
DCBGSB-440500	4150 MHz	Low	10dB	30dB
DCBGSB-550600	5200 MHz	Low	10dB	30dB
DCBGSB-640700	6150 MHz	Low	10dB	30dB
DCBGSB-700750	6650 MHz	Low	10dB	30dB

11.5 About Downconverters, Extended Barrel, Gain Selectable, Broadcast (N Type to BNC)

Product	LO Frequency	LO Side	Gain (Standard)	Gain (High Gain)
DCEBGSB-198270	1850MHz	Low	10dB	30dB

12. Appendix E-Remote Control Guide

This section describes the control protocol used on the RS232 interface for controlling the PRORXD.

12.1 About the RS232 Control General Principles

The physical interface is RS232 but this can be converted to RS485 with an external adapter where multiple units are controlled across one RS485 bus.

Usual operation involves sending a packet from the control device (usually a PC) to the device being controlled. If the packet satisfies an address integrity check, then the controlled device will action the command and send a reply.

For compatibility with modems an ASCII style protocol is used.

Ports are set for 115200 baud, 8 bits, No parity, 1 stop.

12.2 About the Command Packet Structure

ASCII	Value	Notes
STX	02h	Start byte
0-9	30h-39h	4 byte unit address. In range 0-9999
R	20h-7Eh	1 byte command type. r read, w write
ABCD	20h-7Eh	Command –four byte mnemonic
;	3Bh	Separator
PQR	20h-7Eh	Data –Optional, variable length
;	3Bh	Separator
X	20h-7Eh	Sum Check
ETX	03h	End byte

12.3 About the Reply Packet Structure

ASCII	Value	Notes
STX	02h	Start byte
0-9	30h-39h	4 byte unit address. In range 0-9999
R	20h-7Eh	1 byte command type. r read, w write

ASCII	Value	Notes
STX	02h	Start byte
0-9	30h-39h	4 byte unit address. In range 0-9999
Z	20h-7Eh	Status BYTE
PQR	20h-7Eh	Data –Optional, variable length
;	3Bh	Separator
X	20h-7Eh	Sum Check
ETX	03h	End byte

The Sum check byte is the summation of all bytes in the packet, not including the start and end bytes. Higher order bytes are ignored and the final byte result is modified to stop ASCII control characters being sent. Bit 7 (highest) is forced high.

The Status byte will show if the command was performed OK, or will show an error.

ASCII	Meaning
1	All OK
E	General error, command could not be actioned.

Typically E will be returned if the message is formatted incorrectly (separators in the incorrect location) or if commands are in upper case, or if commands do not align with the allowed list of commands, or if the checksum is incorrect.

Addresses in the range 0001 to 9998 are for general use. Address 0000 is reserved and 9999 is a broadcast address. i.e. any device will reply to this address. Its reply will contain its own specific address.

All data in the transmitter and receiver is stored as one of 5 data types, Double, String, List, Integer or HexInteger. The data type dictates the contents of the data section of the reply.

- List – 1 byte for sending. Value is hexadecimal coded as ASCII. 2 byte reply. Reply represents index into original choice list. E.g. Reply 02 indicates entry 2 in original list.
- Float - variable length. Reply always contains decimal point and 4 decimal places. Can have 1 to 3 digits before decimal.
- Integer - 6byte reply. integer value with stuffed with preceding zeros. e.g. GOP reply 000012 = GOP length 12
- String - Variable length. Reply is string excluding null terminator
- HexInteger – 8byte Hex reply.

12.4 About the Programming Model

The control commands operate on four sets of parameters:

- Global parameters which apply to all configs
- Config parameters which apply to one specific config
- Status Parameters which are read-only
- Specials which have unique actions.

To make changes to the settings on the board for Global and Config parameters, they have to be loaded into a "scratch" area. When in the scratch area changes can be made to the parameters. To make the changes permanent the scratch area has to be saved.

To edit a config you have to load it into scratch by specifying the config number you wish to edit. A simple example of changing input frequency is shown below: (<C> represents the checksum)

```
<STX>0001wload;1;<C><ETX>    "Load config 1 into scratch area"
```

```
<STX>0001wdipf;2360.00;<C><ETX>    "Change input frequency to 2360"
```

```
<STX>0001wsave;1;<C><ETX>        "Save scratch to config 1"
```

The config you edit can be different from the currently active config. This means you could edit config 8 in the scratch area and then save it back while config 1 was active. If you edit the active config in scratch, when you save it back it will automatically action any changes. To find the config number currently being edited in scratch, perform an rload command.

The same process applies to Global Settings except that no config number needs to be supplied and the commands change to "wloau" and "wsavu". When editing globals if the changes are saved they are actioned immediately.

Please note that when issuing read and write commands to Global and Config parameters they always read and write to the scratch area.

The load and loau commands can also be used like a reset if any changes must be cancelled, i.e. If the user backs out of an edit menu before saving.

Status parameters are always current and not affected by loads and saves.

Specials are actioned immediately.

12.5 Commands

Command	Description	Access	Setting Type	Default	Type	Possible Values
gadd	ControlAddress	RW	Global	1	Integer	1 to 9998
unam	Unit Name	RW	Global	PRO-RX	String	Max Length = 20
ccon	Current Active Config Number	RW	Global	1	Integer	1 to 8

Command	Description	Access	Setting Type	Default	Type	Possible Values
cnam	Config Name	RW	Config	Config <x>	String	Max Length = 20
gfpg	FPGA Version Number	R	Status	N/A	hex string	
gver	Application version	R	Status	N/A	String	
gser	Serial Number (64 bit)	R	Status	N/A	Hex String (16 hex char)	
gmac	MAC address	R	Status	N/A	String	
gbty	Board Type	R	Status	D320	String	D320
glnf	LNB Fault	R	Status	N/A	integer	0=OK, 1=FAULT
rdef	Restore Unit Defaults	W	Global	N/A	Integer	Any
vstd	Power-up Video Output Standard	RW	Global	0	Integer	0=PAL, 1=NTSC, 2=NTSC no pedestal
lnbg	LNB gain offset	RW	Global	9	Float	"-30 to 30"
spec	OSD Spectrum Select	RW	Global	0	Integer	0=A, 1=B, ..., 5=F
umod	Unit Mode	RW	Config	1	Integer	0=Narrowband, 1=DVBT
dvdn	DVBT Decoder Mode	RW	Config	0	Integer	0=Compliant, 1=Low Delay
divm	Diversity Mode	RW	Config	0	Integer	0=2-way, 1=4-way, 2=6-way, 3=8-way, 4=2x2-way, 5=2x4-way
ddcf	Downconverter LO frequency (MHz) Demod 1	RW	Global	1880	Float	0 - 10000

Command	Description	Access	Setting Type	Default	Type	Possible Values
dlos	Downconverter LO side Demod 1	RW	Global	0	Integer	0=low side, 1=high side
glnb	LNB Phantom Power Enable Demod 1	RW	Global	1	Integer	0=off, 1=on
dipf	Input Frequency Demodulator 1 (MHz)	RW	Config	2405	Float	50.000MHz -> 850MHz offset from LO
dwid	OFDM bandwidth Demodulator 1	RW	Config	0	Integer	0=8MHz, 1=7MHz, 2=6MHz, 3=2.5MHz, 4=1.25MHz
dgua	OFDM Guard Interval Demodulator 1	RW	Config	0	integer	0=1/32, 1=1/16, 2=1/8, 3=1/4, 4=AUTO
dpol	OFDM Polarity Demodulator 1	RW	Config	0	integer	0=Normal, 1=Inverted
ddc2	Downconverter LO frequency (MHz) Demod 2	RW	Global	1880	Float	0 - 10000
dlo2	Downconverter LO side Demod 2	RW	Global	0	Integer	0=low side, 1=high side
gln2	LNB Phantom Power Enable Demod 2	RW	Global	1	Integer	0=off, 1=on
dif2	Input Frequency Demodulator 2 (MHz)	RW	Config	2405	Float	50.000MHz -> 850MHz offset from LO
dwd2	OFDM bandwidth Demodulator 2	RW	Config	0	Integer	0=8MHz, 1=7MHz, 2=6MHz
dgu2	OFDM Guard Interval Demodulator 2	RW	Config	0	integer	0=1/32, 1=1/16, 2=1/8, 3=1/4, 4=AUTO
dpo2	OFDM Polarity Demodulator 2	RW	Config	0	integer	0=Normal, 1=Inverted
sgua	Detected OFDM Guard Interval (Useful in AUTO mode) Demodulator 1	R	Status	0	integer	0=1/32, 1=1/16, 2=1/8, 3=1/4

Command	Description	Access	Setting Type	Default	Type	Possible Values
dmod	Constellation Demod 1	R	Status	N/A	Integer	0=QPSK, 1=16QAM, 2=64QAM
dfec	FEC rate Demod 1	R	Status	N/A	Integer	0=1/2, 1=2/3, 2=3/4, 3=5/6, 4=7/8
snra	Input SNR A Demod 1	R	Status		float	
snrb	Input SNR B Demod 1	R	Status		float	
snrc	Input SNR C Demod 1	R	Status		float	
snrd	Input SNR D Demod 1	R	Status		float	
snre	Input SNR E Demod 1 / 2	R	Status		float	
snrf	Input SNR F Demod 1 / 2	R	Status		float	
snrf	Input SNR G Demod 1 / 2	R	Status		float	
snrf	Input SNR H Demod 1 / 2	R	Status		float	
dina	Input Level A Demod 1	R	Status		float	input level in dBm
dinb	Input Level B Demod 1	R	Status		float	input level in dBm
dinc	Input Level C Demod 1	R	Status		float	input level in dBm
dind	Input Level D Demod 1	R	Status		float	input level in dBm
dine	Input Level E Demod 1 / 2	R	Status		float	input level in dBm
dinf	Input Level F Demod 1 / 2	R	Status		float	input level in dBm
ding	Input Level G Demod 1 / 2	R	Status		float	input level in dBm
dinh	Input Level H Demod 1 / 2	R	Status		float	input level in dBm

Command	Description	Access	Setting Type	Default	Type	Possible Values
dpre	BER Pre-Viterbi Demod 1	R	Status		integer	Pre Viterbi x 10 ⁻⁶
dpos	BER Post-Viterbi Demod 1	R	Status		integer	Post Viterbi x 10 ⁻⁶
dpkt	Packet errors Demod 1	R	Status		integer	
dloc	Lock Status Demod 1	R	Status		integer	0=Not Locked, 1=Locked
sgu2	Detected OFDM Guard Interval (Useful in AUTO mode) Demodulator 2	R	Status	0	integer	0=1/32, 1=1/16, 2=1/8, 3=1/4
dmo2	Constellation Demod 2	R	Status	N/A	Integer	0=QPSK, 1=16QAM, 2=64QAM
dfe2	FEC rate Demod 2	R	Status	N/A	Integer	0=1/2, 1=2/3, 2=3/4, 3=5/6, 4=7/8
dpr2	BER Pre-Viterbi Demod 2	R	Status		integer	Pre Viterbi x 10 ⁻⁶
dpv2	BER Post-Viterbi Demod 2	R	Status		integer	Post Viterbi x 10 ⁻⁶
dpk2	Packet errors Demod 2	R	Status		integer	
dlo2	Lock Status Demod 2	R	Status		integer	0=Not Locked, 1=Locked
dsl1	Decoder 1 Input Select	RW	Config	0	Integer	0=Demodulator1, 1=Demodulator2, 2=ASI Input
dsrc	Default Service Name Decoder 1	RW	Config	Unit 1	String	Max Length = 20 characters
dpr1	Default Program ID Decoder 1	RW	Config	1	Integer	Range = 1 - 10
src1	Service Name Decoder 1	R	Status		String	
vlk1	Video Lock Status Decoder 1	R	Status		integer	0=Not Locked, 1=Locked

Command	Description	Access	Setting Type	Default	Type	Possible Values
vdp1	Video PID Decoder 1	R	Status		integer	
apd1	Audio PID Decoder 1	R	Status		integer	
dpd1	Data PID Decoder 1	R	Status		integer	
ppd1	PCR PID Decoder 1	R	Status		integer	
dbr1	Data baudrate Decoder 1	R	Status	3	integer	0=1200, 1=2400, 2=4800, 3=9600, 4=19200, 5=38400, 6=57600, 7=115200
dpa1	Data parity mode Decoder 1	R	Status	0	integer	0=no parity, 1=odd, 2=even
dty1	Data type Decoder 1	R	Status	0	integer	
dwi1	Data width Decoder 1	R	Status	0	integer	
eli1	Video Line Standard Decoder 1	R	Status		integer	0=PAL(625), 1=NTSC (525), 2=NTSC no pedestal
vrs1	Video Resolution Decoder 1	R	Status		integer	
scr1	Encrypted Service Status Decoder 1	R	Status		integer	0=Clear service, 1=Encrypted service
dsl2	Decoder 2 Input Select	RW	Config	0	Integer	0=Demodulator1, 1=Demodulator2, 2=ASI Input
dss2	Default Service Name Decoder 2	RW	Config	Unit 1	String	Max Length = 20 characters
dpr2	Default Program ID Decoder 2	RW	Config	1	Integer	Range = 1 - 10
srv2	Service Name Decoder 2	R	Status		String	
vlk2	Video Lock Status Decoder 2	R	Status		integer	0=Not Locked, 1=Locked

Command	Description	Access	Setting Type	Default	Type	Possible Values
vdp2	Video PID Decoder 2	R	Status		integer	
apd2	Audio PID Decoder 2	R	Status		integer	
dpd2	Data PID Decoder 2	R	Status		integer	
ppd2	PCR PID Decoder 2	R	Status		integer	
dbr2	Data baudrate Decoder 2	R	Status	3	integer	0=1200, 1=2400, 2=4800, 3=9600, 4=19200, 5=38400, 6=57600, 7=115200
dpa2	Data parity mode Decoder 2	R	Status	0	integer	0=no parity, 1=odd, 2=even
dty2	Data type Decoder 2	R	Status	0	integer	
dwi2	Data width Decoder 2	R	Status	0	integer	
eli2	Video Line Standard Decoder 2	R	Status		integer	0=PAL(625), 1=NTSC (525), 2=NTSC no pedestal
vrs2	Video Resolution Decoder 2	R	Status		integer	
scr2	Encrypted Service Status Decoder 2	R	Status		integer	
asil	ASI Input Lock Status	R	Status		integer	0=Not Locked, 1=Locked
asos	ASI Output Source	RW	Config	0		0=Demodulator1, 1=Demodulator2, 2=ASI Input, 3=Descrambler1, 4=Descrambler2
vdbf	MPEG-4 Video De-blocking Filter	RW	Config	1	Integer	0=Off, 1=On
asas	Second Audio Channel Source	RW	Config	0	Integer	0 = Audio service 1 from decoder 2 1= Audio service 2 from decoder 1

Command	Description	Access	Setting Type	Default	Type	Possible Values
dena	Data input enable	RW	Config	0	integer	0=off, 1=on
dndi	Diversity Setting (num ways licensed for)	R	Status		Integer	0, 2, 4, 6, 8
smin	Receive Spectrum (minimum points)	R	Status		String	string length is 160 bytes. The lower 7 bits of each byte is a spectrum point value. Valid number range 0 to 127. Top bit always set to stop control characters being sent
smax	Receive Spectrum (maximum points)	R	Status		String	string length is 160 bytes. The lower 7 bits of each byte is a spectrum point value. Valid number range 0 to 127. Top bit always set to stop control characters being sent
aout	Audio Output Format	RW	Global	0	Integer	0=Analogue, 1=Digital
icom	IP settings	RW	Special	192.168.0.1, 255.255.255.0, 192.168.0.254	String	comma separated list of <IP address>,<SubnetMask>,<Default Gateway>
idhc	DHCP enable	RW	Special	1	integer	0=off, 1=on
ipac	Active IP address and Subnet mask	R	Special	N/A	integer	comma separated list of <IP address>,<SubnetMask>
sten	Streaming Enable	RW	Global	0	Integer	0=off, 1=on
strs	Streaming Source	RW	Global	0	Integer	0=Demodulator1, 1=Demodulator2, 2=ASI Input, 3=Descrambler1, 4=Descrambler2
stad	Streaming Multicast Address	RW	Global	239.16.3.254	String	IP address format in multicast range
stsa	Streaming SAP Address	RW	Global	224.2.127.254	String	IP address format in SAP range

Command	Description	Access	Setting Type	Default	Type	Possible Values
sttl	Streaming Multicast TTL	RW	Global	127	Integer	Range 1 - 255
stpo	Streaming Multicast Port number	RW	Global	10000	Integer	Range 1 - 65535
stsn	Streaming Multicast Service Name	RW	Global	MPEG2-TS	Integer	Max Length 20 characters
osd1	OSD Mode Decoder 1	RW	Global	0	Integer	0=Off, 1=Simple, 2=Detailed, 3=Engineering
osc1	OSD Enable on Composite Output 1	RW	Global	0	Integer	0=Off, 1=On
oss1	OSD Enable on SDI Output 1	RW	Global	0	Integer	0=Off, 1=On
osl1	OSD Enable Logo on Outputs 1	RW	Global	0	Integer	0=Off, 1=On
osd2	OSD Mode Decoder 2	RW	Global	0	Integer	0=Off, 1=Simple, 2=Detailed, 3=Engineering
osc2	OSD Enable on Composite Output 2	RW	Global	0	Integer	0=Off, 1=On
oss2	OSD Enable on SDI Output 2	RW	Global	0	Integer	0=Off, 1=On
osl2	OSD Enable Logo on Outputs 2	RW	Global	0	Integer	0=Off, 1=On
ss11	OSD Spectral Display Demod 1 Output 1	RW	Global	0	Integer	0 - 7 = RF inputs A - H
ss12	OSD Spectral Display Demod 2 Output 1	RW	Global	0	Integer	4 - 7 = RF inputs E - H
ss21	OSD Spectral Display Demod 1 Output 2	RW	Global	0	Integer	0 - 7 = RF inputs A - H
ss22	OSD Spectral Display Demod 2 Output 2	RW	Global	0	Integer	4 - 7 = RF inputs E - H

Command	Description	Access	Setting Type	Default	Type	Possible Values
sce1	OSD Engineering Mode Output 1	RW	Global	0	Integer	0 = Spectra, 1 = Frequency Scan
sce2	OSD Engineering Mode Output 2	RW	Global	0	Integer	0 = Spectra, 1 = Frequency Scan
desm	Decoder 1 Descrambling Mode	RW	Config		Integer	0=Off, 1=ABS, 4=AES, 5=AES+, 6=AES256, 7=AES256+, 8=BCRYPT, 9=BCRYPT, 10=BCRYPT256, 11=BCRYPT256+
ebsk	Decoder 1 ABS Descrambling Key	W	Config	N/A	Hex String	8 Hexadecimal characters
aesk	Decoder 1 AES Descrambling Key/ AES256 lower 128 bits	W	Config	N/A	Hex String	32 Hexadecimal characters
ae2k	Decoder 1 AES256 Descrambling Key (upper 128 bits)	W	Config	N/A	Hex String	32 Hexadecimal characters
des2	Decoder 2 Descrambling Mode	RW	Config		Integer	0=Off, 1=ABS, 4=AES, 5=AES+, 6=AES256, 7=AES256+, 8=BCRYPT, 9=BCRYPT, 10=BCRYPT256, 11=BCRYPT256+
ebs2	Decoder 2 ABS Descrambling Key	W	Config	N/A	Hex String	8 Hexadecimal characters
aes2	Decoder 2 AES Descrambling Key/ AES256 lower 128 bits	W	Config	N/A	Hex String	32 Hexadecimal characters
a2k2	Decoder 2 AES256 Descrambling Key (upper 128 bits)	W	Config	N/A	Hex String	32 Hexadecimal characters

Command	Description	Access	Setting Type	Default	Type	Possible Values
load	Load config to scratch (on read gives config number in scratch)	RW	Special	1	Integer	1 to 16
save	Save config in scratch to config number given	W	Special	N/A	Integer	1 to 16
loau	Load Global Settings to scratch	W	Special	N/A	N/A	No data field required
savu	Save Global Settings	W	Special	N/A	N/A	No data field required
date	Date and Time	RW	Special	N/A	Integer String	Date can be set and read using the following format: HHmmssDDMMYYYY - All dates and times are UTC no daylight savings.